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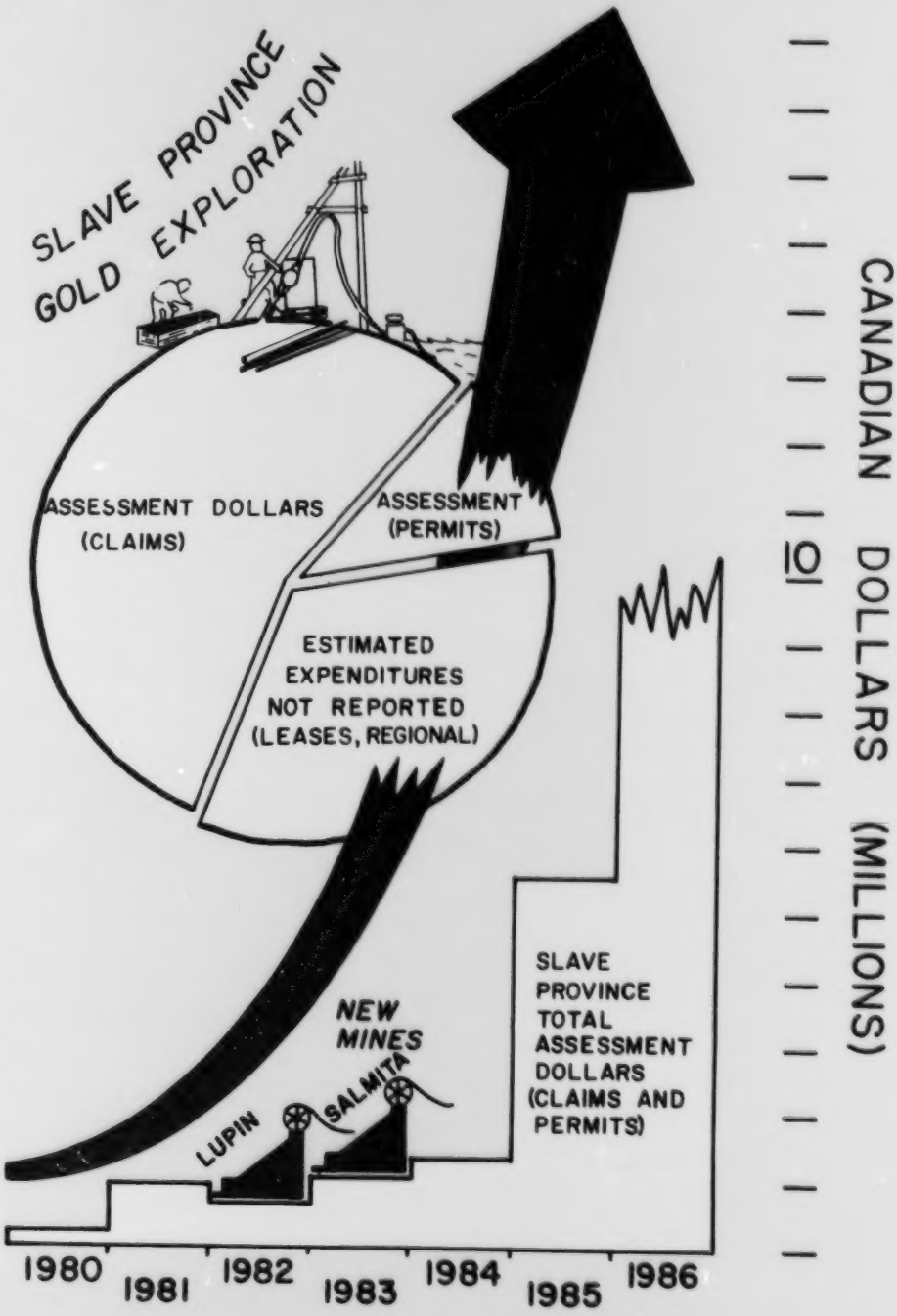
# Mineral Industry report 1984-85
# Northwest Territories

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# Mineral Industry Report 1984-85
# Northwest Territories

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# RESUMÉ


## INTRODUCTION

Le présent rapport traite de l'industrie d'exploration et d'exploitation minières des Territoires du Nord-Ouest (TNO) dans les années 1984 et 1985. Il a été rédigé à Yellowknife par le personnel de la Division de la Géologie du Programme des Affaires du Nord, ministère des Affaires Indiennes et du Nord Canada. Carol Ellis, géologue fonctionnel, a édité les contributions des auteurs de chaque chapitre.

## ORGANIZATION DU RAPPORT

Le rapport comprend 8 chapitres. Le premier chapitre donne un sommaire de l'activité minierè et décrit la fonction et les activités de la Division de la Géologie. Le deuxième chapitre décrit la géologie et la production des mines en operation durant 1984 et 1985. Les 6 autres chapitres décrivent l'exploration minière dans chaqu'une des provinces et sous-provinces géologiques délimitées dans les TNO. Les provinces sont introduites, en guise de préface, par une brève description géologique et un aperçu de l'exploration dont elles ont fait l'objet. Les propriétés explorées dans chaque province ou sous-province sont généralement présentées selon le système national de cartographie.

Les descriptions des propriétés explorées sont composées de sept parties. Le TITRE comprend le nom de la compagnie a qui appartient la propriété, les métaux recherchés et l'emplacement de la propriété selon le système national de cartographie et les coordonnés de latitude et de longitude. La section REFERENCES comprend une liste des publications dans lesquelles sont décrit la géologie et les travaux effectués auparavant sur la propriété. En plus, on a ajouté les numéros des rapports d'évaluation des mines dont on s'est servi pour décrire les travaux effectués et les résultats obtenus. Les deux sections suivantes indiquent les noms des PROPRIETES explorées et leur EMPLACEMENT. La cinquième section décrit l'HISTOIRE de l'exploration sur la propriété et la sixième comprend une DESCRIPTION de la géologie et des gisements de minerai découverts auparavant. La dernière partie est une description des TRAVAUX EFFECTUES en 1984 et 1985 et des résultats de ces travaux. Puisque l'information inclue dans cette partie est abstraite des rapports d'évaluation des mines, la permission des compagnies a qui appartiennent les propriétés a été obtenue avant la publication de ce rapport.

## APERCU GENERAL DE L'EXPLORATION

Le nombre de projets a été un peu plus en 1984 (116) et en 1985 (139) qu'en 1983 (115). La superficie jalonnée a décrut de 27% en 1984 (240,900 ha), mais a augmenté de 23% en 1985 (293,500 ha). Le nombre de permis de prospection émis en 1984 (25) et en 1985 (53) est moins qu'en 1983 (96).

L'or a été le métal le plus recherché. Le nombre de travaux entrepris dans la province des Esclaves en 1984 (57) et en 1985 (92) a continué à augmenter (44 en 1983). L'exploration dans la province d'Ours et la région sud-est du Mackenzie a decliné dramatiquement de 11 projets en 1983 a 3 projets en 1985, mais le nombre de projets dans les autres regions est resté stable.

## APERCU GENERAL DE LA PRODUCTION MINIERE

Les onze mines des TNO ont produit $800 million de métaux en 1984 et $722 million en 1985, plus qu'en 1983, en dépit de le fermeture de la mine B-Zone en 1984, de la mine Silver Bear en avril 1985 et de la mine Shear Lake en août 1986.

La production d'or a continuée d'augmenter aux mines Lupin et Salmita. La production des metaux des autres mines est restée stable.

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# CHAPTER 1
# INTRODUCTION

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**Chief Geologist**

This report describes mining and mineral exploration in the Northwest Territories (NWT) in 1984 and 1985. It was prepared by the staff of the Geology Division of the Northern Affairs Program, Department of Indian and Northern Affairs (DIAND), Yellowknife, NWT, and is one of a series of reports that are now produced biennially.

## SUMMARY OF MINING AND MINERAL EXPLORATION

Until late in 1985 the NWT mining industry fared remarkably well throughout the mining recession that began in 1981. The decline in the price of silver,which brought to an end attempts to bring the Prairie Creek silver-base metal vein deposits of Cadillac Mines Ltd. to production, caused considerable problems for silver producers in the Great Bear Lake silver districts and by early 1985 all the mines in those districts had closed. Low tungsten prices and low demand for this metal forced Canada Tungsten Mining Ltd. to maintain production at its Cantung Mine below capacity for most of 1984 and 1985. Continued declines in the price and demand for lead and zinc accelerated late in 1985 and profitability of the main element of the NWT mining industry, its zinc mines, became questionable.

These negative effects on the NWT's mineral economy were offset considerably by increased production from the Salmita and Lupin gold mines. Production from the Polaris and Nanisivik mines which are on tide water, permitting their zinc-rich ores to remain competitive in world markets during periods of low demand and price, appear less sensitive to price and demand situations than does production at Pine Point.

Lower gold prices in 1985 and high production costs forced the Cullaton Lake operation to shut down in early September.

Exploration expenditures in 1984 were between $30 and $35 million. In 1985, this increased to nearly $45 million. Figures vary between reporting agencies because some report exploration expenditures in and around mines and others do not. Also, not all explorers make their expenditures known.

The re-deployment of mineral exploration effort, which began during the decline in exploration in 1981, was completed during 1984 and 1985. During this period, gold replaced uranium as the major target commodity. Gold exploration is carried out mainly by junior companies so that, although the total number of properties examined has not greatly diminished from the numbers for 1978 to 1980, the levels of expenditures have declined.

Uranium exploration expenditures which declined through 1983, appear to have stabilized, but at a very low level and now represent only about 10% of the total. Base metal exploration expenditures, which had maintained a healthy level mainly because of the search for additional ore reserves around the operating mines, were threatened by the precipitous decline in lead and zinc prices towards the end of 1985. Expenditures for gold exploration continued to increase. Interest in the coal resources of the high Arctic and, to a lesser extent, those of the Interior Platform and Cordillera, which had contributed significantly to exploration expenditures during 1982 and 1983, had ceased completely by 1984.

By the end of 1985, mineral exploration in the NWT appeared to have entered a phase of very unbalanced exploration effort with more than 75% of the expenditures on gold. Over the next five years development of a number of gold deposits of economic grade and tonnage can be expected.

Oil and gas exploration, which is monitored by COGLA (Canadian Oil and Gas Lands Administration) and not by the Geology Division, were important components of the mineral industry. Production increased significantly at Norman Wells with the completion of the pipeline to Alberta and field development continued during the review period. By the end of 1985, NWT oil production had expanded to ten times its former level. Gas production from the Pointed Mountain Field continued at the previous levels.

Oil and gas exploration, a major contributor to the northern economy, was confined mainly to younger fold belts of the NWT (Innuitian and Cordilleran) and to the Beaufort Sea/Mackenzie Delta, part of the continental shelf. Restructuring of the oil and gas land leasing system took place during the first few years of the eighties under the Petroleum Incentives Program.

## MINERAL EXPLORATION MONITORING

Four geologists monitored non-hydrocarbon mineral exploration and mining during the review period.

P.J. Laporte monitored the District of Keewatin, which covers a large part of the Churchill Structural Province, including areas of metamorphically reworked Archean granite-greenstone terrain and extensive later volcanics and post-tectonic continental sandstones and conglomerates. Exploration for unconformity related uranium deposits continued in the latter terrain but at a much lower level than in 1982 and 1983. The main targets are areas believed to be close to the unconformity between the basement and the continental sediments. Gold exploration was concentrated on the reworked Archean and adjacent younger metamorphosed supracrustals.

J.B. Seaton, assisted by J.C. Crux, monitored activity in the Archean Slave and adjacent Proterozoic Bear Structural Provinces. The main target was gold, but also volcanogenic silver-base metal and rare metal pegmatites, in the Slave. Minor efforts continued to be expended on silver and uranium exploration in the Bear Province.

C.C. Lord, who monitored the NWT portion of the Cordillera and adjacent parts of the Interior Platform as far east as 128° W longitude, left the Division in October 1985. J.A. Brophy took charge of the Cordilleran District shortly thereafter. Targets in the Cordillera include tungsten and gold disseminated in and around intrusives along the Selwyn Basin-

Mackenzie Arch hinge zone and placer gold in the streams of the Liard-Nahanni drainage basin. Silver, shale-hosted lead-zinc, coal and barite are also potential targets, though little was done on these in the period under review.

The remainder of the NWT was monitored by W.A. Gibbins. His district includes: 1) the Pine Point mining district and adjacent parts of the Great Slave lowlands where targets are lead and zinc; 2) the East Arm of Great Slave Lake (Athapuscow Fold Belt) and related Proterozoic intrusives along the south edge of the Slave Province, where targets include uranium, silver, copper and, in the intrusives, rare metals; 3) the Churchill Province east of the Keewatin where the main target is uranium; and 4) the Arctic Islands where lead-zinc, coal, uranium, iron and rare-element pegmatites have been found. During 1984-85 there was little exploration in these parts of the Churchill Province or in the East Arm Fold Belt.

Because of the concentration of exploration into the Slave Structural Province, monitoring duties were reallocated early in 1986. Henceforth J.A. Brophy will attend to the southern part of the Slave Province to just beyond the Indin Lake and Courageous-MacKay Lake volcanic belts, and W.A. Gibbins that part of the Slave east of the Bathurst Trench. J.B. Seaton will continue to monitor the Bear Province and the rest of the Slave Province.

Mineral exploration expenditures and the number of properties examined in 1984-85 increased from the levels of 1982-83, and the number of exploration groups involved probably increased as well. This reflects the continued shift from base metal and uranium exploration, which had been dominated by large companies, to gold exploration, which attracts a higher proportion of prospectors, smaller exploration groups and junior mining companies. In 1984, 66% of 116 projects (77) were for gold and in 1985, 68% of 139 projects (95) were for gold (Table 1-1). Table 1-1 relates projects and commodities to the main area and predominant age of rocks containing the target commodities. Table 1-2 shows where the exploration took place within the various NWT districts.

Because of large expenditures in the Pine Point District and around Nanisivik, a considerable amount (probably at least $6 million each year) was expended on base-metal exploration. More than half of this was spent in the Pine Point District. Expenditures on uranium exploration continued to decline and were probably down to $3 million in 1984-85.

In 1984-85, a rare-metal project in the Blatchford Lake complex on the edge of the East Arm Subprovince cost approximately $2 million.

Expenditures on gold exploration and gold property (mine) development probably averaged about $24 million in the NWT during 1984 and 1985, up significantly from previous years.

Table 1-2 shows the shift of exploration from area to area as different commodities, base metals, uranium and gold became major targets between 1975 and 1985. Pine Point, the Arctic Islands and the Cordillera are primarily base metal areas; the Bear and Churchill provinces primarily uranium. The Slave Province hosts as yet uneconomic volcanogenic base metal and silver-base metal deposits and numerous gold deposits, as does the Kaminak Volcanic Belt in the Keewatin.

Land acquisition (Tables 1-3A and 3B) was mainly in areas with gold potential, and exploration in these areas had increased dramatically during the period. Targets are mainly in the Slave Province, but also in the Cullaton Lake area and elsewhere in the Ennadai-Rankin (Kaminak) Volcanic Belt. Placers in the Liard Valley are also targets, but of limited potential.

***TABLE 1-1: EXPLORATION PROJECTS BY TARGET COMMODITY***

| COMMODITY | AGE OF MAIN HOST ROCKS (GEOLOGICAL PROVINCE) | YEAR 82 | 83 | 84 | 85 |
|---|---|---|---|---|---|
| GOLD | ARCHEAN (Slave & Kaminak Subprov.); placer in Nahanni | 25 | 53 | 77 | 95 |
| URANIUM | PROTEROZOIC (Bear & Churchill) | 36 | 25 | 16 | 8 |
| SILVER | PROTEROZOIC (Bear) | 3 | 9 | 3 | 4 |
| BASE METALS | all ages | 30 | 19 | 15 | 10 |
| RARE METALS | ARCHEAN/PROTEROZOIC/ CRETACEOUS (Slave-Bear-Cordillera) | 15 | 7 | 3 | 15 |
| COAL | CRETACEOUS/TERTIARY | 2 | 1 | 1 | 0 |
| MISCELLANEOUS | | 2 | 1 | 1 | 7 |
| TOTALS | | 113 | 115 | 116 | 139 |

Table 1-4 shows higher cost projects that include drilling (29 projects in 1984 and 35 in 1985), a significant decrease compared to the previous six years. Mining development was also down significantly in 1984, although it increased to five projects in 1985; two of these are on small satellite orebodies on the Giant Mines property. Most of the development is on small-scale gold operations that will not add greatly to value of production.

## MINING LAND ACQUISITION

The NAP Mining Lands Division administers most aspects of mineral rights tenure in NWT. Claim maps, mineral property maps and Territorial Resource Base Maps are available on the fourth floor of the Bellanca Building.

***TABLE 1-2: COMPARISON OF ACTIVITY IN VARIOUS GEOLOGICAL PROVINCES AND SUBPROVINCES***

NUMBER OF PROPERTIES EXPLORED EACH YEAR

| GEOLOGICAL REGION | YEAR 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CORDILLERA | 25 | 28 | 13 | 14 | 21 | 29 | 24 | 12 | 11 | 11 | 7 |
| ARCTIC ISLANDS* | 8 | 9 | 6 | 8 | 4 | 7 | 24 | 16 | 11 | 17 | 13 |
| KEEWATIN** | 31 | 37 | 38 | 36 | 48 | 53 | 59 | 34 | 25 | 19 | 17 |
| SE. MACKENZIE** | 3 | 7 | 11 | 7 | 13 | 14 | 25 | 10 | 11 | 9 | 3 |
| EAST ARM | 10 | 7 | 2 | 7 | 6 | 4 | 14 | 3 | 1 | 1 | 2 |
| PINE POINT | 3 | 4 | 3 | 7 | 5 | 6 | 6 | 3 | 2 | 1 | 2 |
| BEAR PROVINCE | 18 | 27 | 35 | 32 | 32 | 22 | 24 | 10 | 11 | 2 | 3 |
| SLAVE PROVINCE | 44 | 44 | 28 | 29 | 33 | 29 | 42 | 25 | 44 | 57 | 92 |
| TOTALS | 142 | 163 | 136 | 140 | 162 | 164 | 218 | 113 | 116 | 117 | 139 |

**Includes Baffin Island and Melville Peninsula, part of the Churchill Province, as well as the Arctic Archipelago.*
***Parts of the Churchill Structural Province.*

*TABLE 1-3A: PROSPECTING PERMITS ISSUED 1976 TO 1985 IN VARIOUS GEOLOGICAL PROVINCES*

| | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AREA | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
| ARCTIC ISLANDS | 0 | 0 | 10 | 0 | 10 | 2 | 53 | 87 | 10 | 15 |
| CORDILLERAN PROV. | 1 | 0 | 5 | 1 | 11 | 9 | 12 | 7 | 0 | 0 |
| CHURCHILL PROV. | 53 | 25 | 50 | 72 | 57 | 54 | 17 | 1 | 10 | 11 |
| BEAR PROVINCE | 13 | 8 | 10 | 26 | 17 | 4 | 3 | 0 | 0 | 5 |
| SLAVE PROVINCE | 1 | 1 | 0 | 0 | 3 | 4 | 6 | 1 | 5 | 22 |
| TOTALS | 68 | 34 | 75 | 99 | 98 | 73 | 91 | 96 | 25 | 53 |

*TABLE 1-4: HIGH COST PROJECT (DRILLING, MINE DEVELOPMENT)*

| | YEAR | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
| DRILLING | 52 | 61 | 81 | 58 | 45 | 54 | 29 | 35 |
| MINE DEVELOPMENT | 2 | 4 | 6 | 12 | 5 | 8 | 4 | 3 |
| PRODUCING MINES | 7 | 8 | 9 | 11 | 12 | 12 | 11 | 9 |
| TOTALS | 61 | 73 | 96 | 81 | 62 | 74 | 44 | 47 |

The NWT is divided into three mining districts: Arctic and Hudson Bay, Mackenzie and the much smaller Nahanni District. Staking records and statistics relating to these areas are kept by the Mining Recorders of the Mining Lands Division. For this report these have been reassembled (Table 1-5) to show activity level by geological areas.

Mineral claim staking during 1984-85 was at the same levels as in the previous two years (1982-83), down significantly when compared to an average of 751,000 ha staked during the previous seven years. Fewer prospecting permits were issued during 1984-85 (Table 1-3A) and most were apparently obtained for gold potential.

The paucity of new prospecting permit applications in areas of uranium potential, the Baker-Thelon and Hornby basins, underscores the shift of exploration to other commodities. Claim staking was down significantly from 1983, from 330,000 ha to slightly more than 240,000 ha in 1984 and 290,000 ha in 1985. Most of this staking was for gold in the Slave Province.

Lapsing of old one unit (20.9 ha) claims continued to reduce the number of claims in good standing by approximately 10% per year, with very little change in the total area held as claims (Table 1-5). Thus, at the end of December 1985, the total number of claims stood at 30,398 and these covered 2,204,790 ha, whereas on December 31, 1983, 40,952 claims covered 3,114,606 ha, a 26% decline in the number of claims held but only a 13% decline in the area.

## NORTHWEST TERRITORIES GEOLOGY DIVISION ACTIVITIES

The Northern Affairs Program of the Department of Indian and Northern Affairs administers for the Northwest Territories (NWT) what elsewhere are provincial level responsibilities for resources, land, economic development and environment, as these responsibilities have been retained by the Federal Government. The NWT Geology Division, stationed in Yellowknife, administers the provincial level responsibilities for geology and for the mining and mineral exploration industries within the territory.

Currently available details on over 100 exploration projects are described in the following sections by the Geology Division's District Geologists, who also monitor producing and developing mines in their respective Districts, a function they share with the Staff Geologist who prepared the chapter of this report recounting production and developments at the twelve mines that produced during 1984 and 1985. The Geology Division also conducts numerous projects to investigate the mineral potential and geological framework of the NWT. Projects conducted by Geology Division staff average 10 to 25 a year. These may be under the direction of any of the geologists on staff. In the past few years most were conducted by geology graduate students employed only during the summer months. These projects are listed in Tables 1-6A (1984) and 1-6B (1985).

*TABLE 1-3B: GROUND STAKED DURING THE YEARS 1976 TO 1985 IN VARIOUS GEOLOGICAL PROVINCES IN THOUSANDS OF HECTARES*

| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|---|
| Arctic Islands | 0.9 | 1.4 | 82.1 | 16.0 | 9.7 | 3.0 | 22.8 | 4.0 | 29.4 | 0.5 |
| Keewatin + | 214.0 | 108.0 | 620.0 | 438.8 | 518.1 | 323.2 | 65.0 | 52.6 | 25.0 | 49.9 |
| SE Mackenzie + | 30.4 | 78.7 | 314.0 | 322.1 | 175.5 | 82.5 | 18.4 | 31.3 | 12.5 | 8.7 |
| Slave Province | 62.2 | 67.8 | 53.9 | 35.6 | 51.0 | 153.3 | 20.7 | 218.5 | 161.2 | 231.3 |
| East Arm × | 1.5 | 2.1 | 2.6 | 11.1 | 0.02 | 11.2 | 0.1 | -- | -- | 0.1 |
| Bear Province | 45.0 | 170.0 | 84.6 | 171.8 | 40.0 | 21.0 | 6.7 | 13.3 | 0.2 | 1.2 |
| Pine Point* | 49.2 | 5.6 | 255.3 | 131.9 | 13.5 | 2.5 | 0.7 | 0.1 | 10.4 | -- |
| Cordillera | 8.2 | 19.9 | 19.0 | 14.4 | 25.2 | 12.9 | 25.0 | 11.6 | 2.2 | 1.8 |
| TOTALS | 411.4 | 453.5 | 1431.5 | 1141.7 | 833.02 | 609.6 | 159.4 | 331.4 | 240.9 | 293.5 |

*+ Churchill Province*
*× Bear Province*
**Interior Platform*

Most extend for two or more years, and some are phases of larger comprehensive programs that last for many years. The Geology Division let twelve contracts to university geologists for geological investigations in 1984 and twelve in 1985 (Tables 1-7A and 1-7B). Some contracts are for projects that are done exclusively by the contractors but a number of contracts provide funds to permit a thesis professor to visit graduate students employed by the Geology Division to conduct a specific mapping project, which will also provide data for use in a thesis. In such cases the contract provides professional expertise and direction, that is commonly not available from Division Staff, to ensure a high standard of work is maintained. Products from both contracts and staff projects include maps and reports which are normally released as Economic Geology Series (EGS) open files. Preliminary reports are published in the Geology Division's yearly Overview of Mining, Exploration and Geology. Final reports are published in the recently initiated series "Contributions to the Geology of the Northwest Territories", are presented in theses at various universities, or are published in journals and symposia volumes.

Tables 1-7A and 1-7B list the contracts issued in 1984 and 1985, the principal workers and the products expected or received. Expediting service was provided out of Yellowknife for Geology Division field crews, ten Geological Survey of Canada field crews and a number of university-sponsored projects supported by the Geology Division.

During 1984, 24 Geology Division projects were underway in various parts of the NWT. Most of these projects continued over 1985. These are briefly described below, with references to that year. A division survey crew under the Project Geologist V.A. Jackson mapped parts of the Yellowknife Volcanic Belt to produce a detailed (1:10,000 scale) map of the Sito Lake area, covering part of the northern extension of the Yellowknife Volcanic Belt in the Quyta Lake area. This crew then moved north to Mistake Lake and mapped 76 M/11 on the Arctic Coast.

During 1985, the 25 field studies financially supported by the Geology Division were spread from the high Arctic (Baffin and Prince of Wales Island) to the Great Slave Lake area.

In the Keewatin, P.J. Laporte (District Geologist) mapped and sampled in the Tehek Lake area to assess the gold potential of the Ketyet River and Woodburn Lake Groups. Open file EGS 1985-11 reports the results of that study.

With Dr. D.D. Hogarth (University of Ottawa), W.A. Gibbins completed geological mapping of "Frobisher's Mine" in the Frobisher Bay area.

More than half of all the projects supported by the Geology Division were done in the Archean Slave Structural Province, where nearly 75% of all company- sponsored mineral exploration projects took place.

Nine field projects were conducted in or adjacent to the Yellowknife Volcanic Belt, host to the Con and Giant gold mines. H. Helmstaedt (Queen's University) is re-evaluating existing geological maps of the belt and preparing a new unified set of detailed maps (1:10,000 scale) and, as well, a new set of 1:50,000 scale maps of Yellowknife Bay, Prosperous Lake and Quyta Lake areas (NTS 85 J/8, 9 and 16). W.K. Fyson (University of Ottawa) continued a long-term project to unravel the complex structural history of the Slave Structural Province, particularly the Yellowknife Supergroup supracrustal component. G. Bailey (Queen's University) completed a study of the Jackson Lake Formation, probably the youngest sedimentary unit in the Yellowknife Volcanic Belt and studied adjacent Kam and Banting Group stratigraphy in order to define stratigraphic relationships at the top of the Kam Group. J.A. Brophy (NAP, Geology) finished detailed mapping of a small area of complex volcanic rocks that include the upper part of the Chan Formation and the lower part of the Crestaurum Formation, the bottom two units of the Kam Group (Helmstaedt and Padgham, 1986). W.A. Padgham reassessed exposures believed to represent the topmost part of that group (the Giant Section), just east of the Giant Mine plant and traced these units south to Kam Point. C. Relf mapped in detail the East and West Mirage Islands previously identified as representatives of the basaltic Kam Group, but now considered part of the overlying Banting Group, a considerably more felsic calc-alkaline volcanic cycle.

V.A. Jackson (NAP, Geology), assisted by a crew of 6 graduate and 4 undergraduate students, mapped most of the east half of the Hepburn Island Area (NTS 76/M). Preliminary

***TABLE 1-5: CHANGES IN CLAIM HOLDINGS BY MINING DISTRICT - 1983 to 1985***

| MINING DISTRICT | GEOLOGICAL PROVINCE | | CLAIMS (TOTAL) | HECTARES (TOTAL) | CLAIMS STAKED | HECTARES STAKED | CLAIMS LAPSED | HECTARES LAPSED |
|---|---|---|---|---|---|---|---|---|
| ARCTIC AND HUDSON BAY | CHURCHILL<br>INNUITIAN REGION<br>ARCTIC PLATFORM<br>BEAR (Northern part) | 1985 | 10,646 | 920,927 | 66 | 50,712 | 3,595 | 218,786 |
| | | 1984 | 14,175 | 1,089,001 | 81 | 54,405 | 1,324 | 212,011 |
| | | 1983 | 15,423 | 1,246,607 | 88 | 59,412 | 1,336 | 394,015 |
| | | % Change from 1983 | -31% | -26% | -25% | -15% | +169% | -44% |
| MACKENZIE | SLAVE, BEAR (main part + East Arm fold belt)<br>CHURCHILL (W part)<br>INTERIOR PLATFORM (Pine Point Dist.)<br>CORDILLERA (north of Canol Rd.) | 1985 | 17,738 | 1,704,885 | 392 | 242,336 | 3,364 | 255,784 |
| | | 1984 | 19,950 | 1,691,437 | 395 | 184,475 | 2,604 | 244,707 |
| | | 1983 | 22,919 | 1,751,669 | 430 | 260,291 | 3,399 | 320,523 |
| | | % Change from 1983 | -23% | -3% | -9% | -7% | -1% | -20% |
| NAHANNI | CORDILLERA (Southwest part) | 1985 | 2,014 | 78,978 | 3 | 1,839 | 392 | 20,648 |
| | | 1984 | 2,403 | 97,787 | 12 | 2,020 | 219 | 20,563 |
| | | 1983 | 2,610 | 116,330 | 29 | 10,889 | 236 | 29,432 |
| | | % Change from 1983 | -23% | -32% | -90% | -83% | +66% | -30% |

maps for 76 M/1, 2, 8, 9 and 16 will be released late in 1986.

A number of projects were undertaken in the Bear Structural Province. Professor D. St-Onge (Terrain Sciences, GSC and University of Ottawa) studied the surficial geology of Glacial Lake Coppermine and, with A. Mercier and D. Kerr (University of Ottawa), the glacial deposits of the Richardson River Valley.

Professor D.G.W. Smith (University of Alberta) continued studies of the mineralogy and chemistry of the Thor Lake rare-metal bearing deposits in the Aphebian Blatchford Lake alkaline intrusive complex that is just north of Hearne Channel on Great Slave Lake.

A program launched in September 1983 to obtain drill core representative of typical orebodies from each of the operating mines in the NWT continued. This core will be filed in the core library to provide a permanent, publicly available record of the NWT orebodies. Response from operating mines has been excellent and, upon completion, the core library should have a collection of considerable scientific value. It is also planned to obtain core representative of ore-bodies that supported mining in the past. Core has also been collected from a number of properties that have recently been drilled, and a number of properties drilled years ago were visited to see if any drill core was salvageable. Success in the latter case has been minimal, but this will be pursued in future years.

## REPORT ORGANIZATION

The organization of this Mineral Industry Report is similar to that of the 1982-83 edition. Because of the concentration of exploration in the Slave Province the chapter on that province has three authors. This also reflects the recent reorganization of the Geology Division to divide the Slave Province between three district geologists, J.A. Brophy, W.A. Gibbins and

***TABLE 1-6A: GEOLOGICAL FIELD WORK CONDUCTED BY NWT GEOLOGY DIVISION EMPLOYEES - 1984***

| PROJECT TITLE | GEOLOGICAL PROVINCE | PRODUCTS | STAFF | STATUS |
|---|---|---|---|---|
| Refinements of the geology of the YK Volcanic Belt | Slave (Mackenzie District) | 1:10K compilation of Yellowknife Volcanic Belt (Mirage Islands to Clan Lake complex) & 1:50K maps Yellowknife Bay, Prosperous Lake and Clan Lake (85 J/8,9,16) | W.A. Padgham, Prof. H. Helmstaedt-mapping and compilation, Prof. S.A. Bowring (Wash. U. of St. Louis)-geochronology | Mapping 85% complete. Compilation and detailed studies underway. Papers on: stratigraphy, Can. J. E. Sci.; Sheeted dykes, Geology. |
| Sito Lake detailed geological mapping | Slave (North end YK Volcanic Belt) | 1:10K and 1:50K geological maps Quyta Lake | summer staff directed by V. Jackson and assisted by H. Helmstaedt | Part of detailed YK Volcanic Belt mapping which is now 85% completed. |
| Mapping Long Lake area of Yellowknife Volcanic Belt | Slave (Mackenzie District) | Tourist's Guide and chapter in Yellowknife Guidebook to sheeted dyke complex at Long Lake | J.A. Brophy (Staff Geologist) | Field component completed September, 1984. |
| Relations of the Jackson Lake Fm. to the Kam and Banting Groups | Slave (Mackenzie District) | Report on stratigraphy. M.Sc. thesis, Yellowknife Bay and Prosperous Lake | G. Bailey (Queen's University) | Completion 1985-1986. |
| Geological mapping East and West Mirage Island Yellowknife Volcanic Belt | Slave (Mackenzie (District) | Report on stratigraphy and lithologies, MSc. thesis, Yellowknife Bay map revisions | C. Relf (Memorial University) | Field work begun mid August, 1984. Completion 1985. |
| Exploration of mafic rocks of Hope Bay Volcanic Belt | Slave (Mackenzie District) | Potential sources of carving stone evaluated for local carvers. Volcanic belt map for mineral exploration | W.A. Gibbins (Arctic Islands District Geologist) | Work to continue in 1985, 1986 and 1987. |
| Anialik River area (76M/11) mapping | Slave (Mackenzie District) | 1:30K preliminary maps. Final maps: 1:50K of supracrustals and 1:20K of part of M/11, 1:250K of Hepburn Island 76/M | summer staff directed by V. Jackson with H. Helmstaedt and W.A. Padgham | Part of mapping of all of 76M. This to be completed in 1985 or 1986. |
| Investigation of turbidite-hosted gold deposits in Slave Province turbidite basins | Slave (Mackenzie District) | Some field work done for paper at GAC Symposium on turbidite-hosted gold deposits | W.A. Padgham | Paper on turbidite hosted quartz veins completed, for GAC symposium volume. |
| Judge Sissons Lake area mapping | Churchill (Keewatin) | 1:30K preliminary map | P.J. Laporte (Keewatin District Geologist) | Ongoing. |
| Evaluation of Soapstone (carvingstone) sources in Foxe Basin | Churchill | Evaluate sources or potential sources of carving stone to assist local carvers. | W.A. Gibbins (Arctic Islands District Geologist) | Project ongoing, 1984 projects completed. |
| Geological mapping of volcanic sequences central Bear Province | Bear (Mackenzie District) | 1:30K preliminary map. MSc. thesis, report | K. Pelletier (Carleton University) and others | Field work 90% complete, preliminary map released 1985. |
| Studies of Placer gold in the Liard River drainage basin | Cordillera (Nahanni District) | Description of placer showings and papers on genesis, evolution and sources of Au | C. Lord (Nahanni District Geologist) | Completed 1985. |

*Table 1-6B. GEOLOGICAL FIELD WORK CONDUCTED BY NWT GEOLOGY DIVISION EMPLOYEES - 1985*

| PROJECT TITLE | GEOLOGICAL PROVINCE | PRODUCT | STAFF | STATUS |
|---|---|---|---|---|
| Yellowknife Volcanic Belt-detailed mapping | Slave | 1:10K detailed maps 1:50K maps 85/J 8,9,16 | H. Helmstaedt, W.A. Padgham, J.A. Brophy, C.E. Ellis, G. Bailey, V.A. Jackson (Quyta), C. Relf (Mirage Islands) | Quyta Lake and Mirage Island mapping completed 1985. |
| Banting-Kam Group/ Jackson Lake Fm. comparisons | Slave | Stratigraphy, structure and relations of units in upper part of the Yellowknife Volcanic Belt | G. Bailey | Ongoing |
| Mirage Islands | Slave | Detailed mapping and study of shear zones in West Mirage rocks | C. Relf | Field work completed |
| Quyta Lake detailed mapping | Slave | 1:10K maps 1:50K Quyta Lake 85J/16 | V.A. Jackson & summer staff | Mapping complete except for granitoids in 76M/NE. |
| Hepburn Island 76/M East half | Slave | 1:30K preliminary maps, 1:50K final maps. Also contribute to 1:250K map of 76/M | V.A. Jackson & summer staff | |
| Reconnaissance, Hope Bay Volcanic Belt | Slave | Preparatory to detailed and 1:50K mapping in 1986 | W.A. Gibbins | Ongoing. Abstract & paper at GAC meeting, 1986. |
| Turbidite-hosted gold-bearing quartz veins | Slave | Mapping of selected gold-bearing quartz veins in Yellowknife Basin | J.A. Brophy (W.K. Fyson) | Ongoing |
| Cameron River Volcanic Belt study | Slave | Structural studies of Cameron River Volcanics | R. Cullen | Ongoing |
| Surficial Geology parts of 76/M | Slave | Addition of surficial geology to bedrock maps | D. Kerr | Completed |
| Geochemical survey of Tehek Lake area | Churchill | Test gold potential of volcanics and iron formation | P.J. Laporte | Open file released |
| Mapping of selected gold showings | Slave | Document various types of gold showings in the Slave Province | J.B. Seaton | Ongoing |

J.B. Seaton, in order to ensure more adequate coverage of mineral exploration.

## DIVISION PUBLICATIONS

The Geology Division produces a dozen releases in the EGS series each year. A list of these in chronological order of release is included on the next page.

A number of releases in preparation in this series include maps displaying the geology of the Proterozoic Nonacho Basin by L. Aspler. A 1:125,000 compilation of the whole basin has been released. More detailed (1:50,000) maps of the basin are in preparation.

A set of compilations of the geology of the Yellowknife Volcanic Belt, parts of 85 J/8,9 and 16, are in preparation. These will be produced at 1:10,000 scale and later compiled at 1:50,000 as part of new maps for Yellowknife Bay (85 J/8), Prosperous Lake (85 J/9) and Quyta Lake (85 J/16).

The following maps are expected to be open filed in 1986:

Geology of the Quyta Lake area, parts of NTS 85 J/9 and 16; by V.A. Jackson and others.

Geology of the West Mirage Islands, NWT, parts of NTS 85 J/7 and 8; by C. Relf and D.C. Nicolson.

Geology of parts of Hepburn Island area 76 M/1,2,8,9, 16 and parts of 15; by V.A. Jackson and others.

Geology, geomorphology and geocryology in the McDougall Pass area, Richardson Mountains, NWT and Yukon, parts of NTS 116 P/9,10 and 16; by J. Mattner.

Geology of Fenton Lake area of the Cameron River Volcanic Belt, parts of NTS 85 I/15, P/2; by R. Cullen.

Geology of the Bell Island Group, District of MacKenzie, parts of NTS 86 D/15,16, E/1; by I. Reichenbach.

Geology of the northeastern Outpost Islands, East Arm of Great Slave Lake; by C.D. Gault and J. Wahlroth.

Volume 3 of Contributions to the Geology of the Northwest Territories is also in preparation. Papers submitted for this volume include:

Geochemistry of Slave Province volcanic rocks, Yellowknife Belt; by A.M. Goodwin, University of Toronto.

Speculations on the origin of rare earth-carbonatite systems; by W.D. Groves, Archean Resources Corp., Vancouver, B.C., and P.J. Gannon, Geological Consultant, Vancouver, B.C.

**TABLE 1-7A: GEOLOGICAL WORK DONE UNDER CONTRACT FOR NWT GEOLOGY DIVISION, NAP IN 1984**

| CONTRACTOR | AMOUNT | AGENT if not contractor | STUDENTS if any | PROJECT NAME OR PURPOSE | PRODUCTS OF CONTRACT, DESCRIPTION AND WHERE AVAILABLE |
|---|---|---|---|---|---|
| University of Alberta | 5000 | R. Kretz | | Metamorphism and metasomatism of graywacke argillite and the Sparrow Pluton and associated pegmatites | Preliminary report in 1984 overview. Final report on Sparrow Lake Pluton and associated pegmatites in Contributions Vol. 2. |
| University of Alberta | 6000 | D. Smith | L.de St. Jorre | Mineralogy, chemistry, genesis, Thor Lake. Rare metal deposits Blachford Lake | Preliminary report 1984 overview. Talk at 1984 Geoscience Forum. Final report in Contributions Vol. 2. |
| University of Alberta | 8000 | B. Jones | F.W. Nentwich | Geological mapping of the Cape Crauford Formation, Brodeur Peninsula, Baffin Island | Preliminary report in 1984 overview. Final report in Contributions Vol. 2 |
| Veekay Consultants Ltd. | 1500 | V.K. Prest | | Study of Esker-Drumlin-Moraine complex west of Dismal Lakes, NWT | Final report Contributions Vol. 2 on eskers as a prospecting tool. |
| Queen's University | 10000 | H. Helmstaedt | G. Bailey | Stratigraphic studies, geological maps, YK Volcanic Belt | Abstracts in overview 1984, open file map EGS 1985-10. Talk at 1984 Geoscience Forum. |
| Washington University of St. Louis | 9500 | S.A. Bowring | | Geochronology of Bear/Slave Provinces | Preliminary report in Contributions Vol. 2. Ph.D. thesis (Browining) received 1985. Various dates for Slave and Bear rocks provided. |
| Carleton University | 9500 | J. Moore | K. Pelletier | Mapping Calder River (Ellington Lake area) | Open file maps EGS 1985-9. Talk at 1984 Geoscience Forum. |
| University of Ottawa | 7500 | O. Dixon | I. Muir | Stratigraphy and sedimentology Imperial & Canol formations | Preliminary report in 1984 overview. Talk at 1984 Geoscience Forum. Final report submitted for Contributions Vol. 3. |
| Carleton University | 9500 | J.A. Donaldson | B. Johnson | Stratigraphic & economic studies, Wilson Island Group East Arm Great Slave Lake | Preliminary report in Contributions Vol. 2, final submitted for Contributions Vol. 3. M.Sc. expected by 1987. |
| University of Toronto | 9500 | A.M. Goodwin | | Petrogenesis of Slave Province Volcanic Belts | Talk at 1984 Geoscience Forum. Final report submitted for Contributions Vol. 3. |
| University of Manitoba | 3000 | P. Cerny | M.A. Wise R.E. Meintzer | Litho-chemical studies of the YK pegmatite field | Abstract in 1984 overview. Final report in Contributions Vol. 2. |
| University of Ottawa | 3000 | D. St. Onge | D.E. Kerr | Surficial geology of the Richardson River Basin | Preliminary report in 1984 overview. Final report in Contributions Vol. 2. |

Stratigraphy and structure of the early Proterozoic Wilson Island Group of Great Slave Lake: implications for its origin; by B.J. Johnson, Ottawa-Carleton Centre for Geoscience Studies.

The formation of gold deposits with particular reference to old rocks and Yellowknife; by R. Kerrich and W.S. Fyfe, University of Western Ontario.

Thrusting between the Cameron River greenstone belt and the Sleepy Dragon metamorphic complex, Slave Province, District of Mackenzie; by Timothy M. Kusky, Johns Hopkins University.

Geophysics and permafrost; by W.J. Scott, Hardy Associates (1978) Ltd.

Continental rifting - the petrotectonic environment of Point and Redrock Lake basalts, Slave Province, NWT; by K. St. Seymour and P. Budkewitsch, Concordia University.

## LIST OF PUBLICATIONS AVAILABLE FROM THE GEOLOGY DIVISION, NORTHERN AFFAIRS PROGRAM BOX 1500, YELLOWKNIFE, NORTHWEST TERRITORIES, X1A 2R3

Updated February 26, 1987

Please note: Orders must be accompanied by payment. Make cheques or money orders must be payable to: The Receiver General of Canada.

### MINERAL INDUSTRY REPORTS (MIR)

MIR 1969-70 ($2.00)
Vol. 2, Northwest Territories, east of 104° W longitude; by P.J. Laporte; DIAND, 1974.

MIR 1969-70 (n/c)
Vol. 3, Northwest Territories, west of 104° W longitude; by T. Padgham, T.W. Caine, D.R. Hughes, C.W. Jefferson, M.M. Kennedy and J.D. Murphy; DIAND.

MIR 1971-72 ($2.50)
Vol. 2, Northwest Territories, east of 104° W longitude; by P.J. Laporte; DIAND, 1974.

## TABLE 1-7B: GEOLOGICAL WORK DONE UNDER CONTRACT FOR NWT GEOLOGY DIVISION, NAP IN 1985

| CONTRACTOR | AMOUNT | AGENT if not contractor | STUDENT if any | PROJECT NAME OR PURPOSE | PRODUCTS OF CONTRACT, DESCRIPTION AND WHERE AVAILABLE |
|---|---|---|---|---|---|
| University of Alberta | 5000 | D.G.W. Smith | L.de St.Jorre | Mineralogical and economic geology evaluations of the Thor Lake rare metal deposits | Poster displays, GAC Meeting Fredricton, CIMM Symposium on granite hosted metal deposits, Geoscience Forum. M.Sc. thesis, (de St.Jorre). Interim report in Overview. |
| University of Alberta | 5000 | R.D. Morton | S. Swatton | Economic geology studies of Bullmoose Lake Gold Deposit | Preliminary report in 85 Overview, M.Sc. & final report for Contributions Vol. 3 received. |
| Memorial University, Newfoundland | 5000 | T. Rivers | C. Relf | Geological mapping in the Mirage Islands: Stratigraphy, structure petrology, and economic geology | Preliminary report in 85 Overview, M.Sc. and final report in preparation. Large scale maps open filed 1986, thesis probably 1987. |
| University of Ottawa | 9000 | W.K. Fyson | R. Cullen | Geological mapping in part of the Cameron River Volcanic Belt and structural studies in the Yellownife Supracrustal Domain | Large scale geological map of a small part of the Cameron River V.B. and contributions the structural understanding of gold deposits in the Yellowknife District. A paper on structural successions in gold quartz veins in the Yellowknife Domain is in press (Can. J. of Earth Sci.). M.Sc. thesis (Cullen, in 1987). |
| University of Western Ontario | 6000 | W.S. Fyfe | D. Anderson | Geological mapping and studies in the Western Plutonic Complex to determine the origin of auriferous shears in the complex | Contribution to: 1:50K maps Yellowknife district, understanding of the relationship of the Western Plutonic Complex to the Yellowknife volcanics and their gold deposits Report in Contributions Vol. 3. |
| Concordia University | 1000 | K. St. Seymour | | Geological mapping and sampling for geochemical, and metamorphic studies in the Point Lake area | Contribution to the understanding of the Itchen and Contwoyto Formations, host to the Lupin gold ore-body. |
| Carleton University | 10000 | J.A. Donaldson | B. Johnson | Mapping stratigraphic, structural and economic studies, Wilson Island Group, host to East Arm gold deposits. | Maps and stratigraphy of the Wilson Island Group submitted for open file. M.Sc. thesis and various papers in preparation. |
| Carleton University | 6000 | J. Blenkinsop | I. Reichenbach | Mapping, early Proterozoic Bell Island Group, Hottah Lake | 1:25,000 scale maps of the Bell Island Group for open file. M.Sc. thesis is nearing completion. |
| H. Helmstaedt | 10000 | | G. Bailey | Studies in the Yellowknife volcanic belt. Preparation of geological maps. | 1:10K maps for all of the Yellowknife Volcanic belt in prep., as are 1:50K compilations. Some 1:10K maps released. M.Sc. thesis in prep. 3 papers on the Yellowknife district are in journals and symposia volumes (see Table 1-8 for details). |
| University of Ottawa | 6000 | D.D. Hogarth | | Study carving stone resource of southern Baffin Island. Investigate Frobisher's mines | Evaluate: carving stone sources, areas potential for additional sources, assess usefulness of any stone found. |
| University of Toronto | 7000 | A.M. Goodwin | | Geochemical sampling and analyses of Slave Province volcanic belts. Development of prospecting guides. | Develop rare element geochemical prospecting technique to make volcanic belt prospecting more efficient. Provide understanding of Archean volcanic belt development. A paper for Contributions Vol. 3. |
| University of Toronto | 8000 | W.M. Schwerdtner | | Structural studies, to provide understanding of economic deposits in the Arctic Archipelago | Publications in various journals. |
| University of Manitoba | 6500 | P. Cerny | R. Meintzner M.A. Wise | Rare element, pegmatites and granite rocks, Yellowknife region | Paper on the granites and associated pegmatites submitted for Yellowknife Guidebook. Ph.D. and M.Sc. theses in preparation. Final results to be published in memoir on the Yellowknife Pegmatite field. |
| Washington University | 6000 | S.A. Bowring | | Geochronological studies in the Slave and Bear Structural Provs. | Provision of geochronological data to develop geological framework for Slave Province miner belts. |

MIR 1971-72 ($3.00)
Vol. 3, Northwest Territories, west of 104° W longitude; by W.A. Padgham, M.M. Kennedy, C.W. Jefferson, D.R. Hughes and J.D. Murphy; DIAND.

MIR 1973 ($3.75)
Northwest Territories; by W.A. Padgham, J.B. Seaton, P.J. Laporte and J.D. Murphy; DIAND.

MIR 1974 ($4.50)
Northwest Territories; by W.A. Gibbins, J.B. Seaton, P.J. Laporte, J.D. Murphy, E.J. Hurdle and W.A. Padgham; DIAND.

MIR 1975 ($6.00)
Northwest Territories; by P.J. Laporte, W.A. Gibbins, E.J. Hurdle, C.C. Lord, W.A. Padgham and J.B. Seaton; DIAND.

MIR 1976 ($6.00)
Northwest Territories; by C.C. Lord, P.J. Laporte, W.A. Gibbins, E.J. Hurdle, J.B. Seaton and W.A. Padgham; DIAND.

MIR 1977 ($6.00)
Northwest Territories; by C.C. Lord, P.J. Laporte, W.A. Gibbins, J.B. Seaton, J.A. Goodwin and W.A. Padgham; DIAND.

MIR 1978 ($7.50)
Northwest Territories; by J.A. Goodwin, P.J. Laporte, C.C. Lord, W.A. Gibbins, J.B. Seaton and W.A. Padgham; DIAND.

MIR 1979 ($7.50)
Northwest Territories; by J.A. Brophy, W.A. Gibbins, P.J. Laporte, C.C. Lord, W.A. Padgham and J.B. Seaton; DIAND.

MIR 1980-81 ($10.00)
Northwest Territories; by J.A. Brophy, W.A. Gibbins, P.J. Laporte, C.C. Lord, W.A. Padgham and J.B. Seaton; DIAND.

MIR 1982-83 ($10.00)
Northwest Territories; by J.A. Brophy, J.C. Crux, W.A. Gibbins, P.J. Laporte, C.C. Lord, W.A. Padgham and J.B. Seaton; DIAND.

## CONTRIBUTIONS TO THE GEOLOGY OF THE NORTHWEST TERRITORIES

Contributions to the geology of the Northwest Territories, Vol. 1; J.A. Brophy, editor ($5.00).

Contributions to the geology of the Northwest Territories, Vol. 2; J.A. Brophy, editor ($6.95).

## EXPLORATION OVERVIEWS

by staff of the Geology Division,
DIAND, Yellowknife, NWT

1974 (N/C)
Mineral exploration in the Northwest Territories.

1975 (N/C)
Mineral exploration in the Northwest Territories.

1976 (N/C)
Mineral exploration in the Northwest Territories.

1977 (N/C)
Mineral exploration in the Northwest Territories.

1978 (N/C)
Mineral exploration in the Northwest Territories.

1979 (N/C)
Mineral exploration in the Northwest Territories.

1980 (N/C)
Mineral exploration in the Northwest Territories.

1981 (N/C)
Mineral exploration in the Northwest Territories.

1982 (N/C)
Mineral exploration in the Northwest Territories.

1983 (N/C)
Mining, Exploration and Geological Investigations, Northwest Territories.

1984 (N/C)
Mining, Exploration and Geological Investigations, Northwest Territories.

1985 (N/C)
Mining, Exploration and Geological Investigations, Northwest Territories; J.C.E. Crux and C.E. Ellis, editors.

1986 (N/C)
Mining, Exploration and Geological Investigations, Northwest Territories; J.C.E. Crux, and C.D. Gault, editors.

## OPEN FILE MAPS AND REPORTS ON THE NWT

by NWT Geology Division
DIAND, Yellowknife, NWT

GSC Open File 129 ($15.00)
Lake sediment geochemical sampling of the Yellowknife, Indin Lake and portions of Cameron River and Beaulieu River greenstone belts; by D. Nickerson (NTS 85B/6; 85 I/10,11,14,15,16; 86 B/1,2,3,4,8; 85 O/14; 86/1,2,8). 14 maps and 1 text.

GCS Open File 135 ($5.00)
Geology of Camsell River silver district, NTS 86 E/9; by R.J. Shegelski and J.D. Murphy. 2 maps and text. 1977 (N/C)

GSC Open File 179 ($2.00)
Preliminary geological map of Rankin Inlet, NTS 55 K/16; by P.J. Laporte and S.K. Frape. 1 map. Mineral exploration in the Northwest Territories.

GSC Open File 199 ($2.00)
Geological map of White Eagle Falls area, NTS 86 F/12; by W.A. Padgham, R.J. Shegelski, J.D. Murphy and C.W. Jefferson. 1 map. 1980 (N/C)

GSC Open File 208 ($2.00)
Geological map of High Lake area, NTS 76 M/7; by W.A. Padgham, R.J. Shegelski, D.R. Hughes and C.W. Jefferson. 1 map.

GSC Open File 239 ($4.00)
Geology of two base metal deposits in the Slave Structural Province (High Lake copper-zinc deposit, NTS 76 M/7, and Indian Mountain Lake zinc-lead-silver-copper deposit, NTS 75 M/2); by W.L. Johnson. 2 maps and text.

EGS 1975-1 ($3.00)
Preliminary geology of Index Lake area, NTS 76 G/3; scale 1:31,680; by W.A. Padgham, C.W. Jefferson, E.A. Ronayne and V.Z. Sterenberg. 1 map with marginal notes.

EGS 1975-2 ($3.00)
Preliminary geology of Agricola Lake area, NTS 76 G/12; scale 1:31,680; by W.A. Padgham, M.P.D. Bryan, C.W. Jefferson, E.A. Ronayne and V.Z. Sterenberg. 1 map with marginal notes.

EGS 1975-3 ($3.00)
Preliminary geology of parts of NTS 76 G/5; scale 1:31,680; by W.A. Padgham, V.Z. Sterenberg, M.P.D. Bryan, E.A. Ronayne and C.W. Jefferson. 1 map.

EGS 1976-1 ($3.00)
Preliminary geology of Heninga Lake area, NTS 65 H/16; scale 1:31,680; by K.R. Barrett and S.R. Leggett. 1 map. See also 1981-4

EGS 1976-2 ($3.00)
Preliminary geology of Ferguson Lake area, NTS 65 I/15; scale 1:31,680; by K.R. Barrett, P.J. Laporte and S.R. Leggett. 1 map.

EGS 1976-3 ($3.00)
A copper-nickel showing on the north shore of Baker Lake, parts of NTS 56 D/2,7; scales 1:15,840 and 1:1,000; by K.R. Barrett, P.J. Laporte and S.R. Leggett. 1 text and 2 figures.

EGS 1976-4 ($3.00)
Preliminary geology of NTS 76 K/2, part of the Hackett River Volcanic Belt; scale 1:31,680; by C.W. Jefferson, W.A. Padgham, M.P.D. Bryan, R.J. Shegelski, E.A. Ronayne, H. Vandor and L. Thorstad. 1 map with marginal notes.

EGS 1976-5 ($3.00)
Preliminary geology of NTS 76 F/9, part of the Hackett River Volcanic Belt; scale 1:31,680; by M.P.D. Bryan, W.A. Padgham, C.W. Jefferson, R.J. Shegelski, E.A. Ronayne, and H.L. Vandor. 1 map with marginal notes.

EGS 1976-6 ($3.00)
Preliminary geology of NTS 76 K/1, part of the Hackett River Volcanic Belt; scale 1:31,680; by M.P.D. Bryan, W.A. Padgham, C.W. Jefferson, R.J. Shegelski, E.A. Ronayne, H.L. Vandor and L.E. Thorstad. 1 map with marginal notes.

EGS 1976-7 ($3.00)
Preliminary geology of NTS 76 F/15, part of the Hackett River Volcanic Belt; scale 1:31,680; by C.W. Jefferson, R.J. Shegelski, M.P.D. Bryan, E.A. Ronayne, H.L. Vandor and L.E. Thorstad. 1 map with marginal notes.

EGS 1976-8 ($3.00)
Preliminary geology of NTS 76 F/16, part of the Hackett River Volcanic Belt; scale 1:31,680; by C.W. Jefferson, M.P.D. Bryan, W.A. Padgham, E.A. Ronayne, V.Z. Sterenberg, R.J. Shegelski, H.L. Vandor and L.E. Thorstad. 1 map with marginal notes.

EGS 1976-17 ($3.00)
Preliminary geology of NTS 86 I/1, part of the Takijug Lake area; scale 1:31,680; by R.S. Hyde, H.A. McLeod, B.T. Scribbins and S.L. Taylor. 1 map with marginal notes.

EGS 1976-18 ($3.00)
Preliminary geology of NTS 86 I/2, part of the Takijug Lake area; scale 1:31,680; by R.S. Hyde, H.A. McLeod, B.T. Scribbins and S.L. Taylor. 1 map with marginal notes.

EGS 1978-1 ($3.00)
Preliminary geology of Amer Lake, parts of NTS 66 H/7,10; scale 1:31,680; by P.J. Laporte, K.R. Barrett and G. Schwab. 1 map.

EGS 1978-2 ($8.00)
1977 exploration activity in the Keewatin District, geology and property ownership in seven active areas of the Keewatin; various scales; by P.J. Laporte. 8 maps and 1 index map.

EGS 1978-4 ($9.00/set, $3.00 each)
Preliminary geology of NTS 86 H/14,15,16, District of Mackenzie, NWT; scale 1:31,680; by A.F.S. Bau, L.B. Aspler and E.J. Hurdle. 3 maps with marginal notes.

EGS 1978-7 ($2.00)
Preliminary geologic map of the Echo Bay region, NWT, Canada, parts of NTS 86 E/16, F/13, K/4, L/1; scale 1:21,505; by R.S. Hildebrand and K. Kittleson. 1 map.

EGS 1978-8 ($3.00)
Surficial geology, permafrost and related engineering problems, Yellowknife area, part of 85 J/8; scale 1:6,000; by L.B. Aspler. 1 map and text.

EGS 1979-2 ($9.00/set; $3.00 each)
Preliminary geology of NTS 86 H/9,10,11; scale 1:31,680; by A.F.S. Bau, S.P. Goff, M.J. Yakey. 3 maps with marginal notes.

EGS 1979-3 ($3.00)
Litho-stratigraphic map of northeast half of Great Bear Lake, parts of 86 K/4,5, 86 L/1; scale 1:50,000; by R.S. Hildebrand. 1 map.

EGS 1979-7 ($3.00)
Preliminary geology of northern Courageous Lake area, parts of NTS 76 D/3,6; scale 1:12,000; by H. Dillon-Leitch. 1 map with marginal notes; also available at 1:25,000.

EGS 1979-9 ($3.00)
Preliminary geology of the southern end of the Yellowknife Greenstone Belt, parts of 85 J/7,8; scale 1:7,500; by H. Helmstaedt, J.A. Goodwin, J.G. Patterson and J. King. 1 map.

EGS 1979-10 ($4.00)
Preliminary geology map of the northern end of the Yellowknife Greenstone Belt, parts of 85 J/9; scale 1:8,500; compiled by L.M. Hauer. 2 maps; also available at 1:2,500.

EGS 1979-11 ($3.00)
Preliminary geology map of eastern Point Lake, parts of 86 H/1,2; scale 1:31,680; by J.A. Goodwin, H. Helmstaedt, J. King,. R. Boodle and S. Pinard. 1 map.

EGS 1979-12 ($4.00)
Preliminary geological map of the Amer Lake area, parts of NTS 66 H/7,10; scale 1:31,680; by Judith G. Patterson and K. Barrett. 1 map with marginal notes.

EGS 1980-1 ($3.00)
Petrographic study of rocks in the Amer Lake area, District of Keewatin, parts of NTS 66 H/10,7; scale 1:83,000; by J.G. Patterson. 1 map and text.

EGS 1980-2 ($2.50)
Stratigraphy, sedimentation & tectonism in the Hornby Bay and Dismal Lakes Groups, Proterozoic, NWT, NTS 86 J,K,L,M,N,O; by C. Kerans, G.M. Ross and J.A. Donaldson. 25 page report, excerpt from 1977 M.I.R.

EGS 1980-4 ($4.00)
Proposed mineral exploration activity, District of Keewatin, parts of NTS 55, 56, 65, 66; scale 1:1,000,000; by P.J. Laporte. 1 map with marginal notes.

EGS 1980-5 ($4.00)
Preliminary geology map of Banting and Walsh Lakes area, 85 J/9, scale 1" = 800'; by H. Helmstaedt, J. King and R. Boodle. 1 map.

EGS 1980-9 ($4.00)
Preliminary geology of the eastern end of the Amer Belt, parts of NTS 66 H/7,8,9,10; scale 1:31,680; by J.G. Patterson and K. Barrett. 2 maps with marginal notes. Update of EGS 1979-12.

EGS 1980-10 ($8.00)
Preliminary geology of eastern Point Lake, parts of 86 H/1,2,7,8; scale 1:31,680; by J.E. King, R. Boodle and M.R. St-Onge. 2 maps with marginal notes; also available at 1:50,000.

EGS 1981-1 ($3.00)
Preliminary geology map of Rainy Lake and White Eagle Falls, NTS 86 E/9; scale 1:50,000; by R.S. Hildebrand, K.S. Pelletier and B.J. Johnson. 1 map with marginal notes. (Superseded by GSC open file 930)

EGS 1981-2 ($4.00)
Proposed mineral exploration activity, District of Keewatin, parts of NTS 55, 56, 65, 66; scale 1:1,000,000; by P.J. Laporte. 1 map with marginal notes.

EGS 1981-3 ($5.00)
Geology of the Walsh Lake area, NTS 85 J/9; scale 1:10,000; by R.M. Easton and V. Jackson. 1 map with marginal notes; also available at 1:25,000.

EGS 1981-4 ($8.00)
Geology of the Heninga-Turquetil-Carr Lakes area, NWT, parts of NTS 55 E/13, L/4, 65 H/16, I/1; scale 1:31,680; by P.J. Laporte, K.R. Barrett, S.R. Leggett. 2 maps with marginal notes. This open file replaces 1976-1.

EGS 1981-5 ($8.00)
Geology of the Pointless Island map area, NTS 86 H/4,5 and parts of NTS 86 H/3,6; scale 1:30,000; by R.M. Easton, R.L. Boodle, L. Zalusky, G. Eiche and D. McKinnon. 4 maps and legend with marginal notes.

EGS 1982-1 ($5.00)
Preliminary geology of Kamut and Adams Lakes area, North-Central Wopmay Orogen, District of Mackenzie, NWT, NTS 85 K/8,9; scale 1:25,000; by S.A. Bowring. 1 map.

EGS 1982-2 ($4.00)
Proposed mineral exploration activity, District of Keewatin, parts of NTS 55, 56, 65, 66; scale 1:1,000,000; by P.J. Laporte. 1 map with marginal notes.

EGS 1982-3 ($5.00)
Preliminary geology of the Taltheilei Narrows-Point Busse area, NTS 75 L/12; scale 1:14,000; by Karen S. Pelletier. 1 map and text.

EGS 1982-4 ($5.00)
Geology of Keskarrah Bay area, Slave Structural Province, District of Mackenzie, NWT, parts of NTS 86 H/2,6,7,8; scale 1:31,680; by V. Jackson. 1 map with marginal notes.

EGS 1982-5 ($15.00/set; $5.00 each)
Geology of the east side of Yellowknife Bay, NTS 85 J/8,9; scale 1:10,000; by R.M. Easton, C. Ellis, H. Helmstaedt, V. Jackson, B. O'Hearn, M. Dean, H.C. Bruneau and J. Wahlroth. 3 maps with marginal notes; also available at 1:25,000.

EGS 1982-6 ($8.00)
Geology of the Typhoon Point area, High Lake Greenstone Belt, District of Mackenzie, NWT, NTS 76 M/10 and part of 76 M/15; scale 1:31,680; by R.M. Easton, C. Ellis, M. Dean, G. Bailey, H.C. Bruneau and J. Wahlroth. 1 map with marginal notes.

EGS 1982-7 ($5.00)
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Geology of Keskarrah Bay area, NWT, parts of NTS 86 H/6,7; scale 1:30,000; by V.A. Jackson. 1 map with marginal notes.

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# CHAPTER 2
# OPERATING MINES, 1984-85

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## INTRODUCTION

Eleven mines treated ores at ten mills in the Northwest Territories (NWT) in 1984 (Fig. 2-1). These included six gold mines (Con, Giant, Salmita, Lupin, B-Zone and Shear Lake), three lead-zinc mines (Pine Point, Nanisivik and Polaris), one silver mine (Silver Bear) and one tungsten mine (Cantung). Royex Gold Mining Corporation's Shear Lake Mine in the Keewatin was the only newcomer in 1984, but declining gold prices forced it to close in August of 1985. Royex's neighbouring deposit, the B-Zone Mine, was closed in mid-1984 after activities shifted to Shear Lake. Another casualty was Terra Mines Limited's Silver Bear Mine in the Bear Structural Province, which was forced to close in April of 1985 because of declining silver prices. Summary information on the operating mines is given in Table 2-1, and metal production for the years 1983 to 1985 is tabulated in Table 2-2.

The NWT mines directly employed more than 2800 persons in 1984-85, about 13% of the NWT workforce. The NWT contribution to Canada's total metal output in 1984 included: tungsten 75%, lead 34%, zinc 30%, gold 15.5%, and silver 4.6%. The value of NWT metal production in 1984 was more than that individually of Manitoba, Saskatchewan, Alberta, the Yukon Territory and all of the Maritime Provinces except Newfoundland. Similar statistics are not available for 1985 at the time of writing.

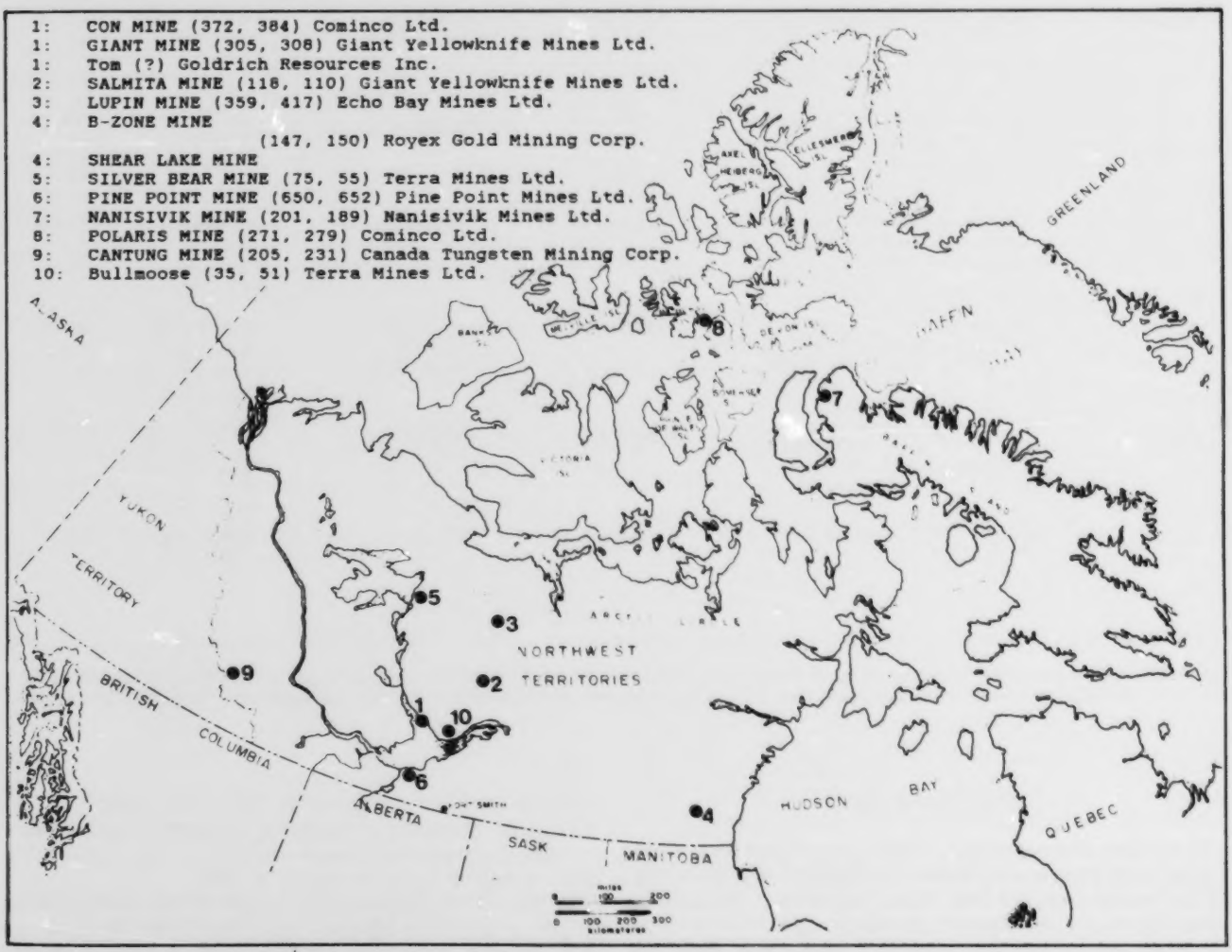


*FIGURE 2-1: Key to operating and developing mines discussed in text. The table at upper left gives the mine name, operator's name, and the 1984 and 1985 workforce. Developing mines are in lower case.*

*TABLE 2-1: SUMMARY DATA, NWT MINES, 1984-1985*

| MINE | COMMODITY | 1984 RATE | MILLED 1984 | PROD'N 1984 | JAN '85 RESERVES |
|---|---|---|---|---|---|
| Con | Au (Ag, $As_2O_3$) | 612 tpd | 223.6 kt | 2772.0 kg Au<br>554.4 kg Ag<br>1269.0 t $As_2O_3$ | 1542.2 kt @<br>14.4 g/t Au |
| Giant | Au (Ag, $As_2O_3$) | 809 tpd | 295.3 kt | 1997.4 kg Au<br>340.8 kg Ag<br>3415.0 t $As_2O_3$ | 958.9 kt @<br>8.23 g/t Au |
| Salmita | Au (Ag) | 150 tpd | 55.1 kt | 1382.1 kg Au<br>262.4 kg Ag | 79.8 kt @<br>29.1 g/t Au |
| Lupin | Au (Ag) | 1345 tpd | 491.0 kt | 5645.6 kg Au<br>820.0 kg Ag | 3141.3 kt @<br>12.2 g/t Au |
| B-Zone | Au (Ag) | — | 52.1 kt<br>Closed<br>Mid-Year | 450.0 kg Au<br>41.0 kg Ag | ? |
| Shear Lake | Au (Ag) | 381 tpd | 87.2 kt | 423.0 kg Au<br>27.0 kg Ag | ? |
| Silver Bear | Ag | 58 tpd | 21.1 kt | 24,620 kg Ag | ? |
| Pine Point | Zn, Pb | 6244 tpd | 2,278.9 kt | 163.4 kt Zn<br>51.1 kt Pb | 21,772.3 kt @<br>6.0% Zn<br>2.7% Pb |
| Nanisivik | Zn, PbZn, Pb Ag | 1900 tpd | 692.9 kt | 67.7 kt Zn<br>7.0 kt Pb<br>27,061 kg Ag | 3150.0 kt @<br>9.5% Zn<br>0.5% Pb<br>48.0 g/t Ag |
| Polaris | Zn, Pb | 2319 tpd | 846.5 kt | 110.5 kt Zn<br>28.4 kt Pb | 19,958.0 kt @<br>14.3% Zn<br>3.8% Pb |
| Cantung | $WO_3$ | 881 tpd | 321.6 kt | 3.53 kt $WO_3$ | 2541.0 kt @<br>1.39% $WO_3$ |

*Sources: Reserve figures are taken from company annual reports. Information on rates, throughput and production is taken from the Annual Mining Report of the Mining Inspection Service of the Government of the NWT. This report is compiled from information given to the Mining Inspection*

## 1984 HIGHLIGHTS

The value of metal output in 1984 was a record $800 million (Table 2-2), 56% more than that of 1983 and 34% more than the previous record of $595 million set in 1982. Reasons for this improved performance were threefold:

1: After being forced to close for 5.5 months in 1983, Pine Point was able to resume full-scale production because of healthier lead and zinc prices in 1984 (Table 2-3).

2: After 11 months of supplying customers from inventory in 1983, the market for tungsten improved and Cantung was able to resume full-scale mining in 1984.

3: Despite the declining price of gold (Table 2-3), the value of gold produced in 1984 was more than that of the previous year because of increased output from Lupin and Salmita (Table 2-3).

| 1985 RATE | MILLED 1985 | PROD'N 1985 | JAN '86 RESERVES | GEOLOGICAL SYNOPSIS |
|---|---|---|---|---|
| 555 tpd | 202.7 kt | 2526.3 kg Au<br>633.0 kg Ag<br>1141 t $As_2O_3$ | 1360 kt @<br>13.7 gt Au | Epigenitic metamorphic-hydro-thermal deposits in shear zones in Archean Yellowknife Bay Formation (upper Kam Group) mafic metavolcanics, Slave Province. |
| 828 tpd | 302.3 kt | 2029.6 kg Au<br>567.7 kg Ag<br>2957 t $As_2O_3$ | 964 kt @<br>8.2 g/t Au | Same as above |
| 176 tpd | 64.5 kt | 1981.2 kg Au<br>359.7 kg Ag | 45 kt @<br>37 g/t Au | Syngenetic-exhalative (?) deposit in quartz vein at contact between Yellowknife Supergroup metavolcanics and metasediments, Slave Province. |
| 1564 tpd | 570.9 kt | 6069.4 kg Au<br>1186.1 kg Ag | 2783.3 kt @<br>11.66 g/t Au | Syngenetic-exhalative deposit in iron formation in Archean Contwoyto Formation metasediments, Slave Province. |
| | CLOSED | NONE | ? | Syngenetic-exhaltative (?) deposit in iron formation in Archean Henik Group metasediments, Churchill Province. |
| 341 tpd | 82.1 kt<br>Closed<br>August | 407.0 kg Au<br>34.5 kg Au | ? | Epigenetic deposits in sub-vertical shears in the basal part of the the Aphebian Hurwitz Group quartzite, Churchill Province. |
| 55 tpd | 5.8 kt<br>Closed<br>April | 6745.8 kg Ag | ? | Epigenetic magmatic-hydrothermal deposits in fault zones in Aphebian Labine Group supracrustals and comagmatic intrusions, Bear Province. |
| 5855 tpd | 2137.3 kt | 165.6 kt Zn<br>61.5 kt Pb | 14,500 kt @<br>6.7% Zn<br>2.7% Pb | Mississippi Valley-type deposits in karsted and dolomitized Middle Devonian Pine Point Group carbonates, Interior Platform. |
| 1897 tpd | 692.5 kt | 61.0 kt Zn<br>5.1 kt Pb<br>23,512 kg Ag | Not Available | Mississippi Valley-type (?) deposits in Neohelikian Society Cliffs Formation dolostone, North Baffin Rift Zone. |
| 2564 tpd | 936.0 kt | 117.8 kt Zn<br>30.0 kt Pb | 19,000 kt @<br>14.3% Zn<br>3.8% Pb | Mississippi Valley-type deposit in karsted and dolomitized Ordovician Thumb Mountain Formation carbonates, Arctic Platform |
| 947 tpd | 345.8 kt | 3.72 kt $WO_3$ | 1.36 kt @<br>1.24% $WO_3$ | Skarns at contact between Cretaceous acid intrusion and Paleozoic limestone. |

*Service monthly by the mines. The rate, throughput and production figures are within 1% of similar figures published in company annual reports except for the following: Polaris reports 819.1 kt milled in 1984. Pine Point reports 46.2 kt Pb produced in 1984. Cantung reports 307.5 kt milled in 1984.*

## 1985 HIGHLIGHTS

The year was marked by declining prices for all of the commodities mined in the NWT (Table 2-3). The value of metal output in 1985 declined 9.8% to $722 million, despite overall increased productivity. Lower gold and silver prices contributed to the closures of the Shear Lake gold mine and the Silver Bear silver mine. Nevertheless, gold output was up slightly from 1984 because of increases in the mill capacities at Lupin and Salmita. Reduced base-metal prices prompted Pine Point to announce that the mine might be forced to close as early as 1987.

*TABLE 2-2: METAL PRODUCTION SUMMARY, NWT MINES, 1983-1985*

| COMMODITY | MINE | 1983 PROD'N ($ × 10⁶) | ($1984 PROD'N ($ × 10⁶) | 1985 PROD'N ($ × 10⁶) |
|---|---|---|---|---|
| gold | Con | 2219 kg | 2772.0 kg | 2526.3 kg |
| | Giant | 1963 kg | 1997.4 kg | 2029.6 kg |
| | Salmita | 159 kg | 1382.1 kg | 1981.2 kg |
| | Lupin | 3758 kg | 5645.6 kg | 6089.4 kg |
| | B-Zone | 1147 kg | 450.0 kg | — |
| | Shear Lake | — | 423.0 kg | 407.0 kg |
| **TOTAL Au** | | **9246 kg ($155.05)** | **12670.1 kg ($195.32)** | **13013.5 kg ($186.07)** |
| silver | Con | 460 kg | 554.4 kg | 633.0 kg |
| | Giant | 552 kg | 340.8 kg | 567.7 kg |
| | Salmita | 32 kg | 262.4 kg | 359.7 kg |
| | Lupin | 287 kg | 820.0 kg | 1186.1 kg |
| | B-Zone | 24 kg | 41.0 kg | — |
| | Shear Lake | — | 27.0 kg | 34.5 kg |
| | Silver Bear | 45539 kg | 24620.0 kg | 6745.8 kg |
| | Nanisivik | 26225 kg | 27061.0 kg | 23512.0 kg |
| **TOTAL Ag** | | **73119 kg ($33.1)** | **53726.6 kg ($18.72)** | **33038.8 kg ($9.30)** |
| zinc | Pine Point | 67.6 kt | 163.4 kt | 165.6 kt |
| | Nanisivik | 61.0 kt | 67.7 kt | 61.0 kt |
| | Polaris | 117.6 kt | 110.5 kt | 117.8 kt |
| **TOTAL Zn** | | **246.2 kt ($283.26)** | **341.6 kt ($477.84)** | **344.4 kt ($430.28)** |
| lead | Pine Point | 23.2 kt | 51.1 kt | 61.5 kt |
| | Nanisivik | 6.4 kt | 7.0 kt | 5.1 kt |
| | Polaris | 34.6 kt | 28.4 kt | 30.0 kt |
| **TOTAL Pb** | | **64.2 kt ($37.84)** | **86.5 kt ($64.45)** | **96.6 kt ($56.04)** |
| **TOTAL $WO_3$** | **Cantung** | **0.35 kt ($3.76)** | **3.53 kt ($38.07)** | **3.72 kt ($38.60)** |
| arsenic trioxide | Con | 0.25 kt | 1.27 kt | 1.14 kt |
| | Giant | 0.73 kt | 3.42 kt | 2.96 kt |
| **TOTAL $As_2O_3$** | | **0.98 kt ($0.60)** | **4.69 kt ($5.84)** | **4.10 kt ($1.70)** |
| | | | | |
| **TOTAL VALUE PROD'N ($x10⁶)** | | $513.85 | $800.2 | $722.0 |

*Source: Production figures from the Mining Inspection Service of the Government of the NWT. See footnote below Table 2-1 for details. Values calculated using the metal prices listed in Table 2-3. The total value of NWT mineral output is a subjective figure inasmuch as it does not account for factors such as smelter penalties on byproducts, selling forward and stockpiling. Arsenic-trioxide values are based on information from Con and Giant mines. The NWT also produces a small amount of by product cadmium and bismuth ($ 200,000/yr.).*

## FUTURE DEVELOPMENTS

Two new gold mines, Bullmoose and Tom (Fig. 2-1), are expected to come on stream in 1986. Both are turbidite-hosted quartz-vein deposits in Archean metasediments of the Yellowknife Supracrustal Basin. At Goldrich Resources Incorporated's Tom prospect, several kilometers north of Giant Mine, proven and probable reserves amount to 13,600 t grading 13.0 ppm Au (0.38 oz/ton). An additional 15,400 t of possible reserves grading 8.4 ppm Au (0.22 oz/ton) may be available. Underground development is currently in progress. At Terra Mines Limited's Bullmoose prospect, 85 km east-southeast of Yellowknife, proven and probable reserves of 97,500 t grading 11.9 ppm Au (0.35 oz/ton) have been outlined by drilling, trenching and underground development on more than a dozen veins. Possible reserves total 80,000 t grading 11.2 ppm Au (0.33 oz/ton). Construction of a test mill is in progress.

*TABLE 2-3: AVERAGE ANNUAL PRICE OF METALS (CDN FUNDS)*

| METAL | UNIT | 1983($) | 1984($) | 1983-1984 % CHANGE | 1985($) | 1984-1985 % CHANGE |
|---|---|---|---|---|---|---|
| Gold | g (oz) | 16.77 (521.59) | 15.42 (479.49) | – 8.05% | 14.30 (444.71) | – 7.26% |
| Silver | g (oz) | 0.453 (14.08) | 0.348 (10.84) | – 23.18% | 0.282 (8.76) | – 18.97% |
| Zinc | kg (1b) | 1.15 (0.523) | 1.40 (0.636) | + 21.74% | 1.24 (0.568) | – 11.43% |
| Lead | kg (1b) | 0.589 (0.268) | 0.745 (0.339) | + 26.49% | 0.580 (0.263) | – 22.15% |
| $WO_3$ | kg (1b) | 10.79 (4.88) | 10.79 (4.91) | – 0.47% | 10.38 (4.72) | – 3.80% |

*Sources:* *Gold: Northern Miner, Cdn banks bids average for 1984 and 1985 of weekly quotations*
*Silver: Northern Miner, Handy and Harman average for 1984 and 1985 of weekly quotations*
*lead, zinc: Northern Miner, Canadian market average for 1984 and 1985 of weekly quotations*
*tungsten: Canada Tungsten Mines*

## CONTENT AND FORMAT OF CHAPTER 2

In this chapter, the operating mines are discussed in the same sequence as they are listed in Table 2-1. Because all of the mines that operated in 1984-85 were described and illustrated in detail in the Mineral Industry Report for 1982/83 (Brophy, 1985), the descriptions given here will be far briefer and will include comparatively fewer diagrams. A bibliography has been retained at the end of the chapter that includes not only those references cited in the text, but a comprehensive listing of papers pertaining to the mines and their environs. The SI (metric) system is used throughout this chapter. For those unfamiliar with the SI system, a list of relevant conversions to the Imperial system is given in Table 2-4.

*TABLE 2-4: KEY TO ABBREVIATIONS AND METRIC/IMPERIAL CONVERSION TABLE*

| | |
|---|---|
| g = grams | 31.103 g = 1 oz |
| t = tonnes | 34.286 g/t = 1 oz/ton |
| tpd = tonnes per day | 0.90718 Mt = $10^6$ tons |
| Mt = megatonnes = $10^6$ tonnes | 0.90718 kt = $10^3$ tons |
| kt = kilotonnes = $10^3$ tonnes | 1 g = 0.03215 oz |
| oz = troy ounces | 1 g/t = 0.02917 oz/ton |
| ton = short ton | 1 t = 1.1023 tons |
| | 1 Mt = 1,102,311 tons |
| | 1 kt = 1,102.31 tons |

## CON MINE

Cominco Ltd.
P.O. Box 2000
Yellowknife, NWT
X1A 2M1

Gold, Silver
85 J/8
Con shaft at:
62°26'22"N, 114°22'08"W

### REFERENCES

Boyle (1961); Campbell (1947); Helmstaedt and Padgham (1986); Henderson (1985); Henderson and Brown (1966).

### PROPERTY

CON 1-4; GG 1-14; MEG 1-10; MIDNIGHT 1; NEGUS 1-4; PIZ 1-2; P&G 1-4; ROSE; SOL 1-4; STAR 1-2.

### LOCATION

The claims lie partly within Yellowknife's city limits. The mill is about 1.6 km south of the centre of Yellowknife.

### HISTORY

The CON, P&G and NEGUS claims were staked between 1935 and 1937 after news of a gold discovery was announced by Dr. A.W. Jolliffe, a GSC geologist who was mapping the area. Cominco's production was first from the Con Mine on the CON group in 1938, and then from the Rycon Mine on the P&G group in 1939. The Negus Mine on the NEGUS group operated between 1939 and 1952 and was subsequently acquired by Cominco from Negus Mines Ltd. Today, the three mines are linked by underground workings and are referred to collectively as Con Mine. The remaining claims that adjoin the core CON-P&G-NEGUS groups were acquired mainly between 1936 and 1948. Deep drilling in 1944 intersected the Campbell Shear Zone east of the original mine workings. Since 1958, the bulk of Con's production has been from this zone. Between 1938 and 1985, Con Mine (including Rycon and Negus) has produced 120,871 kg of gold from 6,386 kt of ore for an average grade of 18.93 g/t Au.

### DESCRIPTION

The mine workings are in the upper part of the Kam Formation (Henderson and Brown, 1966; Henderson, 1985), a 10- to 12-km wide, north-northeasterly striking, steeply dipping, homoclinal succession of Archean mafic flows and tuffs intruded by numerous dikes, sills and irregular bodies of gabbroic composition. Metamorphic grade ranges from greenschist in the upper part of the Kam to amphibolite at the base, where it is cut by the Western Granodiorite Complex (Fig. 2-2). Helmstaedt and Padgham (1986) have recently proposed a fourfold subdivision of the Kam and its elevation to Group status. According to their revised stratigraphy, most of the gold deposits in the Kam Group are in its uppermost formation, the Yellowkife Bay Formation.

Gold is hosted in shear zones cutting mafic volcanic flows of the Yellowknife Bay Formation. The largest and most productive of these is the Campbell Shear Zone, which strikes north-northeasterly, dips steeply west, is 60 to more than 300 m wide and has been traced along strike for about 8 km. The shear zone is open to the south under the waters of Yellowknife Bay and is cut off to the north by the north-trending West Bay Fault (Fig. 2-2). Resection of 5 km sinistral displacement along

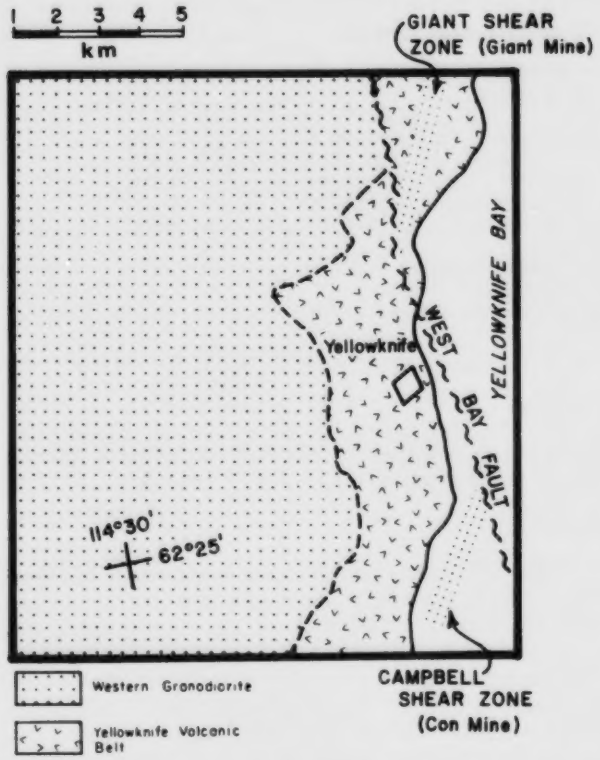


*FIGURE 2-2: Simplified geology of the Yellowknife area showing the Giant and Campbell shear zones offset along the West Bay Fault.*

this fault juxtaposes the Campbell Shear Zone against the Giant Shear Zone, the main productive zone at Giant Mine to the north of Yellowknife (Campbell, 1947). Boyle (1961) considered these major shear zones to be thrust faults and the mineralization to be metamorphic-hydrothermal in origin.

Ore shoots, which are typically 2 to 6 m wide and 90 m long, generally comprise lenses and veins of quartz that are enveloped by a narrow chlorite-carbonate-sericite-sulphide alteration halo and appear to have been emplaced in dilational parts of the shear system. Most of the gold now mined at Con is free milling and occurs as minute nuggets, films and plates in fractures, vugs and vein contacts.

In 1982, a plant to recover arsenic trioxide from wastes was completed, however, full production was delayed because of difficulties in attaining process specifications.

### CURRENT WORK AND RESULTS

A ten-year summary of production and reserves at Con is given in Table 2-5, and a more detailed account of current production is given in Table 2-1.

A record amount of ore was milled in 1984. Lower production was achieved in 1985 because of time lost to install new hoist ropes in the Robertson Shaft, which was deepened from 1,653 to 1,900 m. The extended part of the shaft will enter full service in mid-1986 and will open up four new working levels to give access to at least 725 kt of ore grading about 13.7 g/t Au. Total cost of the shaft deepening project was $9.6 million.

In April of 1986, Cominco invited proposals for the purchase of Con Mine, announcing that the mine no longer suited Cominco's long-term business strategy.

***TABLE 2-5: PRODUCTION AND RESERVES, CON, 1976-1985***

| | PRODUCTION | | RESERVES | |
|---|---|---|---|---|
| Year | kt Mined | kg Au | Mt Reserves | Grade: g/t Au |
| 1976 | 136 | 2800 | 1.33 | 20.3 |
| 1977 | 142 | 2900 | 1.48 | 19.9 |
| 1978 | 192 | 3550 | 1.50 | 19.6 |
| 1979 | 197 | 2950 | 1.63 | 17.9 |
| 1980 | 192 | 3000 | 2.00 | 16.8 |
| 1981 | 176 | 2300 | 1.90 | 16.8 |
| 1982 | 212 | 2470 | 1.90 | 16.1 |
| 1983 | 190 | 2220 | 1.72 | 15.1 |
| 1984 | 224 | 2770 | 1.54 | 14.4 |
| 1985 | 203 | 2530 | 1.36 | 13.7 |

## GIANT MINE

Giant Yellowknife Mines Ltd.
Bag Service 3000
Yellowknife, NWT
X1A 2M2

Gold, Silver
85 J/8, 9
'C' Shaft at:
62°29'57"N, 114°21'40"W

### REFERENCES

Boyle (1961); Campbell (1947); Helmstaedt and Padgham (1986); Henderson (1985); Henderson and Brown (1966); Padgham (1975).

### PROPERTY

AES 27-50; 1 FB claim; GIANT 1-21; GIANT X1-X5; LAW 2-3; 6 LOLOR claims.

### HISTORY

The claims were staked in 1935-1936 after news of a gold discovery was announced by Dr. A.W. Jolliffe, a GSC geologist who was mapping the area. In 1944, after almost a decade of exploration, Giant Yellowknife Mines Ltd. intersected the gold-bearing Giant Shear Zone (Fig. 2-2) under Baker Creek valley by drilling on the GIANT claims. The first gold brick from Giant Mine was poured in 1948. The company eventually acquired majority interest in the LOLOR and AES claims on which the Lolor and Supercrest mines were put into production in 1967, although together these have accounted for only 8.5% of the Giant operation's total mill feed. The three mines are now linked by underground workings and are usually referred to collectively as Giant Mine. Production from open pits began in 1974 and has accounted for as much as 40% of Giant's production in recent years. A plant to recover arsenic trioxide from wastes was completed in 1980.

### DESCRIPTION

The geology of the mine area is similar to that previously described for the Con Mine, however, there are some differences between the ore deposits. Con ore zones tend to be narrower and shorter in plan length, but longer in dip length than those at Giant. The Campbell Shear Zone at Con is more

strongly sheared than the Giant Shear Zone, and most of the ore at Giant Mine is associated with arsenopyrite and is refractory (Padgham, 1975).

## CURRENT WORK AND RESULTS

A ten-year summary of production and reserves at Giant is given in Table 2-6, and a more detailed account of current production is given in Table 2-1. During both 1984 and 1985, sufficient reserves were outlined to replace the ore that was mined. Current production and development data from the three individual mines are summarized in Table 2-7.

In 1984, a decline was completed to the DCW zone near the A shaft (Brophy, 1985). By year-end this zone was essentially mined out.

A decline was started from a portal in the B-2 Open Pit towards the UBC Zone, about 520 m to the west. This zone is unique because it is the only orebody in the Kam Group that is not in the Yellowknife Bay Formation, the uppermost formation. Rather, it is immediately below the underlying Townsite Formation in basaltic flows of the upper part of the Crestaurum Formation (Helmstaedt and Padgham, 1986). Although the UBC Zone is a shear, it differs from Giant's other auriferous shears in that sulphides are relatively sparse, carbonate-sericite alteration is poorly developed or absent, and the gold is free milling. The decline reached the UBC Zone at the 72-m-level by year-end 1985, and ore grade is expected to be 17.1 g/t Au across a mining width of 1.5 m and along a potential strike length of 46 m. A new surface crusher was installed in 1985 to handle ore from satellite orebodies (eg, UBC Zone) as well as mill feed from the open pits.

Another satellite orebody, the GKP Zone, is at the north end of the Supercrest Mine property. After drilling in 1984, a decline to the GKP Zone was advanced 350 m in 1985. Drill-indicated reserves are 36 kt grading about 12.0 g/t Au, of which 28 kt are on the Supercrest property and the remainder on Giant-controlled property to the north.

In 1984-85, six deep holes totalling 4960 m were drilled to test for possible ore-bearing structures underlying the Giant orebodies. Although sheared and altered rocks were encountered, no significant gold concentrations were intersected.

In 1985, one-third of 74 holes totalling 7800 m intersected ore-grade material across mineable widths on the Northbelt option, approximately 10 km north of the mill.

*TABLE 2-6: PRODUCTION AND RESERVES, GIANT, 1976-1985*

| | PRODUCTION | | RESERVES | |
|---|---|---|---|---|
| Year | kt Mined | kg Au | Mt Reserves | Grade: g/t Au |
| 1976 | 390 | 3350 | 1.36 | 11.70 |
| 1977 | 405 | 3300 | 0.80 | 11.70 |
| 1978 | 360 | 2950 | 1.20 | 9.30 |
| 1979 | 380 | 2350 | 1.85 | 7.20 |
| 1980 | 205 | 1190 | 1.80 | 7.20 |
| 1981 | 360 | 1825 | 1.10 | 8.20 |
| 1982 | 366 | 2260 | 0.90 | 8.20 |
| 1983 | 297 | 1960 | 1.00 | 7.90 |
| 1984 | 295 | 2000 | 0.96 | 8.23 |
| 1985 | 302 | 2030 | 0.96 | 8.20 |

Giant celebrated the pouring of its 10,000th gold brick, in November of 1985, bringing total gold production since operations first began in 1948 to 179,314 kg from about 11,300 kt of ore for an average recovered grade of 15.87 g/t Au.

# SALMITA MINE

Giant Yellowknife Mines Ltd.
Bag Service 3000
Yellowknife, NWT,
X1A 2M2

Gold, Silver
76 D/3
64°04'30"N,
111°14'30"W

## REFERENCES

Dillon-Leitch (1984); Henderson (1944); Moore (1956); Ransom (1983).

## PROPERTY

GIANT 1, JEJA 1-6; LT 1-3: LUFF 1-4; MAD 1-18; RED 24; REP 1-12; SALERNO 1-18; TOUGH 1-6; WIN 1-18.

## LOCATION

Salmita is on the east shore of Matthews Lake, 240 km north-northeast of Yellowknife, to which it is seasonally connected by ice road. The mine is also serviced by a 1350 m gravel airstrip.

*TABLE 2-7: PRODUCTION AND DEVELOPMENT, GIANT, LOLOR AND SUPERCREST MINES, 1984-1985*

| MINE | GOLD RECOVERY | GOLD OUTPUT | MILLED | GRADE g/t Au | RESERVES | RESERVE GRADE g/t Au | OPERATING COST $/g Au | LATERAL ADVANCE | DEFINITION DRILLING | FEED FROM OPEN PITS |
|---|---|---|---|---|---|---|---|---|---|---|
| GIANT 1984 | | 1975 kg | 290 kt | 7.85 | 932.6 kt | 8.23 | 12.92 | 4135 m | 9390 m | 40.9% |
| GIANT 1985 | | 2030 kg | 302 kt | 7.82 | 909.9 kt | 7.89 | 12.83 | 4320 m | 7940 m | 30.9% |
| LOLOR 1984 | | 35 kg | 5.3 kt | 7.82 | 1.8 kt | 8.23 | 13.71 | minor | minor | |
| LOLOR 1985 | | none | none | – | 1.8 kt | 8.23 | – | none | none | |
| SUPERCREST 1984 | | none | none | – | 24.5 kt | 11.66 | – | none | none | |
| SUPERCREST 1985 | | none | none | – | *54.6 kt | 12.34 | – | *351 m | | |
| TOTAL 1984 | 86% | 2010 kg | 295.3 kt | | 958.9 kt | 8.23 | 12.94 | | | 40.9% |
| TOTAL 1985 | 85.9% | 2030 kg | 302 kt | | 964.3 kt | 8.20 | 12.83 | | | 30.9% |

**includes GKP zone. Source: Giant Yellowknife Mines Ltd. Annual Reports, 1984 and 1985.*

## HISTORY

Most of the claims were staked between 1945 and 1951. After exploration and development by Salmita Northwest Mines Ltd. (1951-1952) and Bluebell Enterprises Ltd (1970-1973), the Salmita property (LT, LUFF, SALERNO and TUFF claims) was optioned to Giant Yellowknife Mines Ltd. in 1974. Exploration and development in 1975 and 1976 led to a feasibility study in 1981 which recommended extensive underground development. The southern claims (JEJA, MAD & REP claims) belonged to Tundra Gold Mines Ltd. and were the site of the Tundra Mine, which operated between 1964 and 1968. Giant acquired the Tundra property and refurbished the mill to treat Salmita ore. RED 24 is situated at 64°06'30"N, 111°15'W, several kilometers north of the other contiguous claims. RED 24 was transferred to Giant from Mr. Knud Rasmussen in 1973.

## DESCRIPTION

Production from Salmita is mainly from the B-Vein, a steeply east-dipping, northerly trending 1.5- to 2.5-m-wide, 150 m long quartz vein that for the most part is stratiform between argillite on the footwall and meta-basalt on the hanging wall. In its regional context, the vein is stratigraphically associated with an interval of greenschist-facies felsic volcanics near the top of the predominantly mafic Courageous Lake-Mackay Lake Volcanic Belt (Dillon-Leitch, 1981; Henderson, 1944; Moore, 1956; see Fig. 2-3). Gold showings to the north of Salmita, on RED 24 and on property held jointly by Getty Mines Ltd. and Noranda, are hosted in this same package of felsic flows.

In the B-Vein, free-milling gold in the quartz vein is associated with minor sulphides and scheelite. Ransom (1983) suggested that the B-Vein might be a syngenetic deposit formed from solutions exhaled onto the sea floor. The stratiform nature of the deposit, the greater intensity of alteration (silicification, carbonatization and sulphidization) in the footwall, and the possible presence of a stringer zone in the footwall support his conclusions.

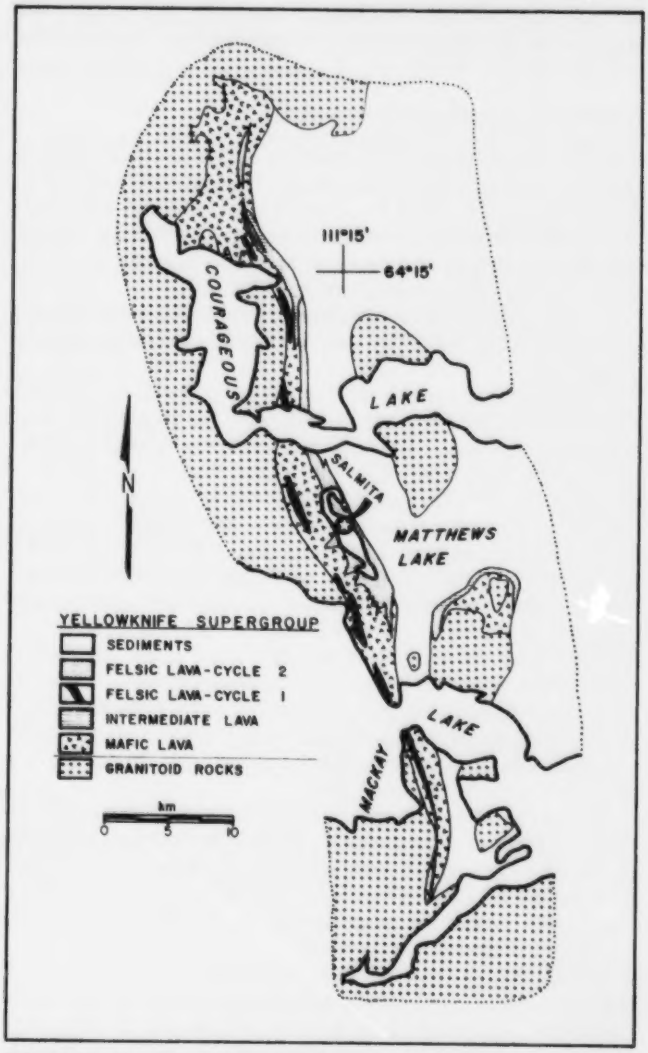


*FIGURE 2-3: Simplified geology of the Courageous Lake-MacKay Lake volcanic belt (from Dillon-Leitch, 1981).*

## CURRENT WORK AND RESULTS

A summary of production and development data since Salmita operations first began in July of 1983 is given in Table 2-8. In 1984, the decline was advanced to the 6th (300-m) level and extraction headings were established on the 5th (250-m) level, where the vein is about 95 m long and up to 2.0 m wide. Drilling and development work on a parallel structure, the T Vein, was undertaken, but results were disappointing because gold is erratically distributed. Freeze-up problems

***TABLE 2-8: PRODUCTION AND DEVELOPMENT DATA, SALMITA MINE, 1983-1985***

| Year | Gold Recovery | Gold Output | Milled | Grade g/t Au | Reserves | Reserve Grade g/t Au | Operating Cost per g/Au | Development |
|---|---|---|---|---|---|---|---|---|
| 1983 | 85.3% | 159 kg | 11.9 kt | 15.60 | 105.2 kt | 28.10 | — | Spiral ramp advanced to 4th (200-m) level. |
| 1984 | 95.7% | 1381 kg | 55.1 kt | 29.20 | 79.8 kt | 29.10 | $9.28 | Ramp advanced to 6th (300-m) level. Underground drilling of 21 holes (1695 m). |
| 1985 | 98% | 1981 kg | 64.5 kt | 31.34 | 45.0 kt | 37.00 | $7.56 | Ramp advanced to 7th (350-m) level, shaft sinking 424 m from winze on 6th level. Underground drilling of 37 holes (7691 m). |

*Source: Giant Yellowknife Mines Ltd. Annual Reports.*

experienced in the ore bin in 1984 were resolved by installing a screen and using a larger ball mill.

Exploration in 1984 was conducted on Salmita property and on optioned ground to the south. Twenty-eight holes totalling 4266 m were drilled from surface on various showings. Encouraging gold intersections were obtained 1.1 km southeast of the mine, 2.3 km south of the Tundra mill, and to the north of the mine within 300 m of present workings.

In 1985, the ramp was extended to the 7th (350-m) level and an internal shaft was sunk 424 m from the 6th level. This shaft, which will extend to the 10th (500 m) level, will give access to a small, high-grade orebody identified by underground drilling between the 6th and 10th levels.

Exploration drilling in 1985 totalled 15,353 m in 129 holes. On RED 24 to the north of the Salmita property, 12,700 t of ore grading 19.54 g/t Au were outlined in felsic volcanic rocks adjacent to a diabase dike (personal communication; Salmita Division personnel). Results were not encouraging in follow-up drilling of other targets identified in 1984.

## LUPIN MINE

Echo Bay Mines Ltd.
3300 Manulife Place
10180 101 St.
Edmonton, Alta., T5J 3S4

Gold, Silver
76 E/14
65°46'N, 111°13'30'W

### REFERENCES

Bostock (1980); Gibbins (1981); Kerswill and others (1983); Tremblay (1976).

### PROPERTY

CONGO 1-9; 111 MOP claims; PAT 1-3.

### LOCATION

Lupin is on the west shore of northern Contwoyto Lake, 402 km north-northeast of Yellowknife, to which it is connected seasonally by ice road. It is also serviced by a 1,525 m gravel airstrip.

### HISTORY

The main showing was staked by a Canadian Nickel Company Limited (Canico) reconnaissance crew in 1960. The property was optioned to Echo Bay Mines Limited in 1979 and subsequently purchased subject to royalty payments. The first gold brick was poured in May, 1982.

### DESCRIPTION

The Lupin Mine area is underlain by highly folded, greenschist-facies turbidites of the Archean Contwoyto Formation (Bostock, 1980; Tremblay, 1976; Fig. 2-4). Intercalated with the turbiditic arenites and argillites are scattered units of silicate, sulphide, and oxide-facies iron formation. Ore at Lupin is associated with a stratiform iron formation unit that includes both silicate and sulphide facies. The unit has been deformed into a tight, steeply north-plunging, Z-shaped fold whose three northerly trending limbs are referred to as the East, Centre and West zones (Fig. 2-5). Dips are steep and all zones have been traced along a strike length of about 300 m. The Centre Zone is the largest of the three and includes from 5 m to 25 m of mixed sulphide and silicate-facies iron formation. Ore-grade gold is in the sulphide facies, which comprises pyrrhotite (greater than 20%), grunerite, quartz and feldspar, as well as subordinate porphyroblastic arsenopyrite, loellingite and almandine garnet. The silicate facies is similar, but sulphide poor. Two types of ore have been recognized in sulphide-facies iron formation at Lupin: a uniformly distributed arsenic-poor type containing abundant finely layered pyrrhotite; and a more localized arsenopyrite and loellingite-rich type that is clearly restricted to the margins of late quartz veins and shear zones. In the former, most of the gold is disseminated as large grains (50 $\mu$m) adjacent to pyrrhotite. In the arsenic-rich type, finer-grained gold (20 $\mu$m or less) is mainly along arsenopyrite-loellingite grain boundaries (Kerswill and others, 1983). Gibbins (1981) and Kerswill and others (1983) consider that most of the features in the Lupin orebody are consistent with chemical sedimentation and syngenetic concentration of gold, silver, iron, sulfur and silica from hydrothermal fluids during deposition of the Lupin ore unit. Tremblay (1976), however, believes that the iron formation at Contwoyto Lake is clastic in origin.

### CURRENT WORK AND RESULTS

#### Lupin 1984

Lower operating costs (Table 2-9) were achieved by a 50% expansion of mill capacity and throughput. This enabled the cut-off grade for economically recoverable ore to be reduced from 6.86 to 5.14 g/t Au, which is reflected in the lower reserves grade at year end (Table 2-9).

Mine development included a total drift advance of about 4500 m, with the main emphasis on preparation of the East Zone for production between the 87-m and 170-m levels, and extension of the ramp 80 m to the 250-m level. Production was from the Centre Zone above the 170-m level and from the East Zone above the 87-m level. Preparations were completed for deepening the mine shaft from its present depth of 370 m to a planned depth of 785 m by 1987.

Underground exploration was conducted on the 170-m level to evaluate the West Zone and from the 87-m level to evaluate a new zone to the east of the East Zone known as the L-19 Zone.

#### Lupin 1985

Mill throughput increased to 1556 tpd from 1347 tpd the previous year, resulting in a 7.5% increase in gold output (Table 2-9). Most production came from the 170-m level of the Centre Zone, with some from the 250-m and 170-m levels of the East Zone and the 87-m level of the West Zone. The ramp was extended from the 250-m level to the 330-m level. The shaft was deepened to 705 m and stations were cut at the 410-, 490-, 570- and 650-m levels. A drift was begun towards the Centre Zone on the 650-m level and drilling was completed into the West Zone from the three lowest levels. This development work is expected to substantially increase the reserves, which are presently calculated only to a depth of 400 m.

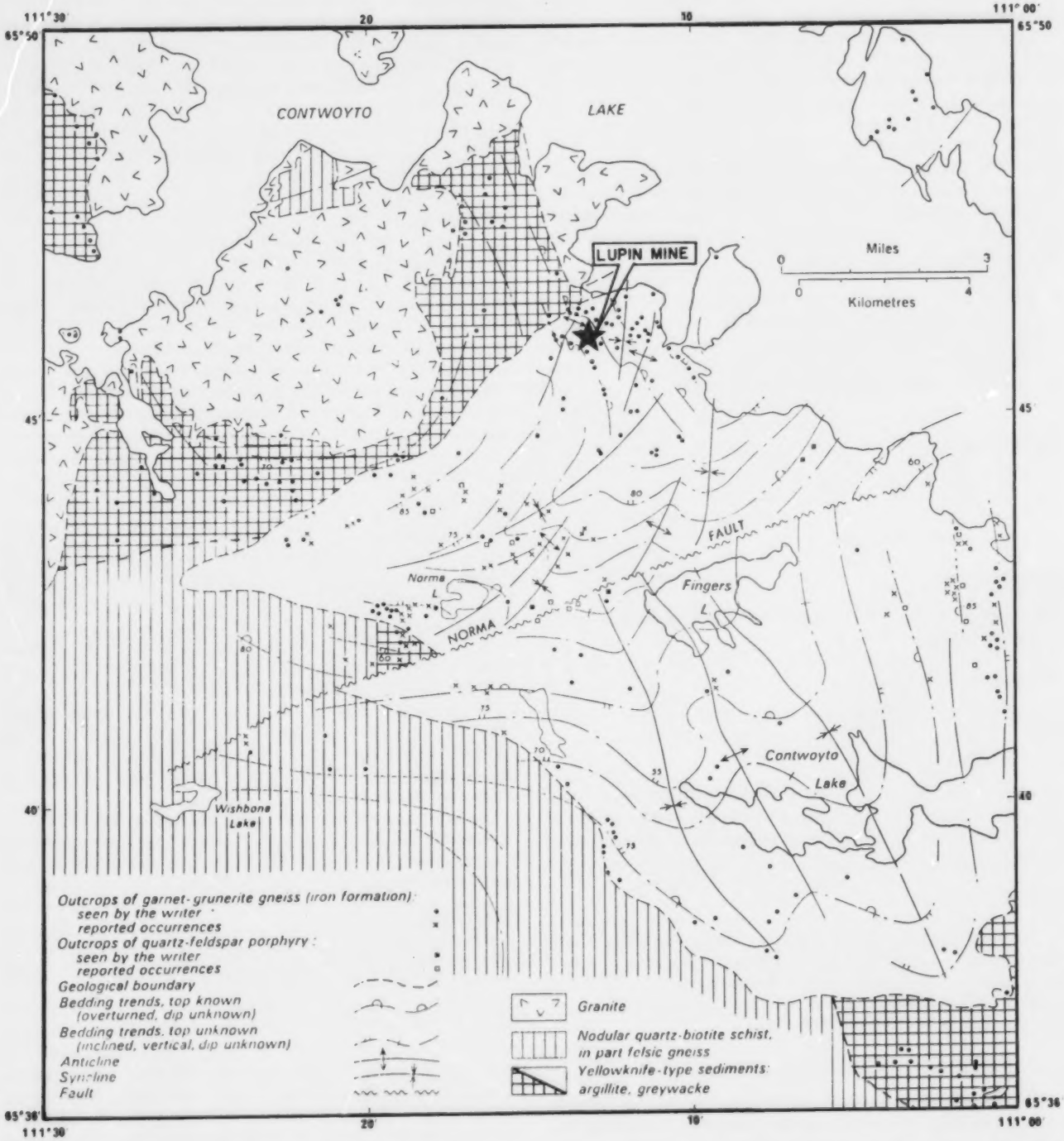


*FIGURE 2-4: Regional geology of the Lupin Mine area. Contwoyto Formation argillite and greywacke metamorphosed to greenschist facies are shown in white; amphibolite-grade facies are cross-hatched. The Itchen Formation in the map area is metamorphosed to amphibolite facies and is distinguished from the Contwoyto Formation by the absence of iron-formation lenses. (modified from Tremblay, 1976)*

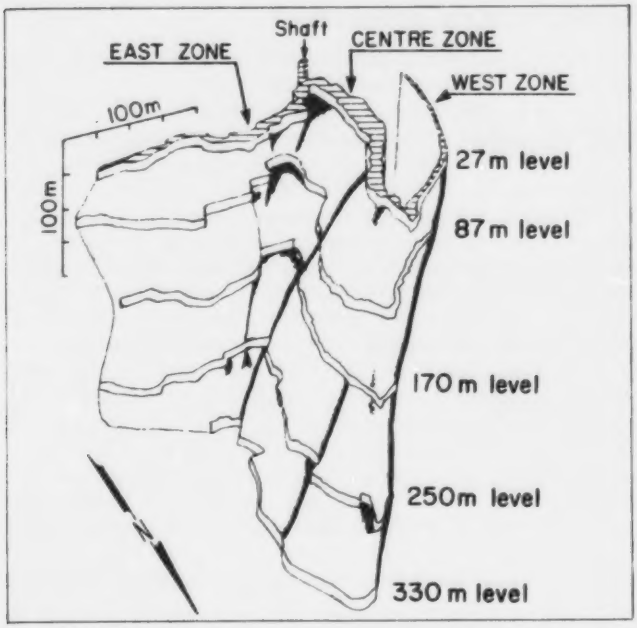


*FIGURE 2-5: Isometric view of the Lupin orebody from the 27-m to the 330-m level (from Echo Bay Mines Ltd. Annual Report, 1982).*

***TABLE 2-9: PRODUCTION, RESERVES AND OPERATING COSTS, LUPIN, 1982-1985***

| Year | Milled | Output | Recovery | Reserves and Grade | Operating Cost/t |
|---|---|---|---|---|---|
| 1982 | 199 Kt | 1626 kg | – | 3129 kt @ 13.6 g/t Au | – |
| 1983 | 323 Kt | 3758 kg | 94.3% | 3080 kt @ 13.6 g/t Au | $95 |
| 1984 | 491 Kt | 5646 kg | 95.2% | 3141 kt @ 12.2 g/t Au | $72 |
| 1985 | 571 Kt | 6069 kg | 95.2% | 2783 kt @ 11.7 g/t Au | $72 |

*Source: Echo Bay Mines Ltd. Annual Reports, 1982-1985.*

## B-ZONE & SHEAR LAKE

Royex Gold Mining Corporation Gold, silver
#1710 141 Adelaide St. W. 65 G 1,7,8
Toronto, Ont., M5G 2G4 61°17'N, 98°31'W

### REFERENCES

Brophy (1985); Laporte (1983); Page (1981).

### PROPERTY

B-Zone: AIR 1-12; CEP claim; 13 DWE claims, GILT 1-15, 17-22, 25-29; SUE claim.
Shear Lake: MIK 3-5, 11-132.

### LOCATION

B-Zone is about 840 km east-southeast of Yellowknife and 400 km north of Churchill, Manitoba. Shear Lake is about 5 km north of B-Zone. The mines are serviced by a 1500 m gravel airstrip.

### HISTORY

Gold-bearing float was discovered in the vicinity of B-Zone by Selco Exploration Company Limited in 1961. Geophysical surveys and diamond drilling between 1961 and 1964 outlined several zones of auriferous iron formation, including the B-Zone. Some of the Selco properties lapsed and were restaked in 1972 by a consortium of companies (Royex Mining Ltd., Sturgex Mining Ltd. and Hewlet Mines Ltd.). O'Brien Gold Mines Ltd. purchased the Hewlet interest in 1973 and acquired additional claims from Selco. A decline was driven into the B-Zone in 1976 in accordance with the terms of an option agreement granted to Consolidated Durham Mines and Resources Ltd. In 1980, Cullaton Lake Gold Mines Ltd. was formed to develop and operate the mine, which came on stream the following year. Royex Gold Mining Corporation was amalgamated in December of 1980 and acquired total ownership of Cullaton Lake Gold Mines.

The Shear Lake Showing, several kilometers north of B-Zone (Fig. 2-6), was first staked in 1946 and was explored by Hudson Bay Mining and Smelting Ltd. and Selco Exploration Company Ltd. In 1973, the property was transferred to Royex Sturgex Mining Ltd. In 1982, Cullaton Lake Gold Mines Ltd. (wholly owned by Royex Gold Mining Corporation) agreed to a joint venture through which development costs and proceeds would be shared.

### DESCRIPTION

B-Zone is underlain by Archean greywacke, argillite and banded iron formation of the Henik Group in the Churchill Structural Province (Fig. 2-6). The sediments were metamorphosed to lower greenschist facies and deformed into north-trending overturned folds with west-dipping limbs during the Hudsonian orogeny. The B-Zone deposit is a 75 to 125 m thick and 250 m long segment of a discontinuous iron-formation unit that has been traced for 2400 m. The unit consists of four facies of iron formation; carbonate, oxide, silicate and sulphide. Gold is in the sulphide facies, which ranges in thickness from 0.6 to 17.4 m and occurs within or bordering the oxide (magnetite-rich) facies. The sulphide facies resembles that described previously for Lupin Mine, but is not as well layered. The sulphides at B-Zone include pyrrhotite, pyrite and minor arsenopyrite and chalcopyrite forming 5% to 20% of the rock. Gold grains are 3 to 10 $\mu$m wide and are within the non-metallic gangue minerals or along sulpide grain boundaries (Laporte, 1983). Page (1981) postulated a syngenetic-exhalative origin for B-Zone involving gold precipitation from hydrothermal fluids.

Several kilometers north of B-Zone, gently east-dipping, Aphebian clastics of the Hurwitz Group lie unconformably on Archean rocks of the Henik Group and host the Shear Lake deposit (Fig. 2-6). Gold is in a series of 1 to 2 m wide, easterly trending, vertical to steeply south-dipping shears cutting orthoquartzite near the base of the Hurwitz succession. The shears consist of quartz (or altered quartzite?) and more than 10% disseminated pyrite extensively altered to iron oxides above the 100-m level in the mine. The shears have been traced a maximum of 275 m along strike. Little has been written about the origin of the Shear Lake deposit, although the presence of stratiform gold deposits in the Hurwitz Group prompted Brophy (1985) to suggest that gold may have been remobilized into the shears from paleoplacers.

***TABLE 2-10: PRODUCTION AND RESERVES, B-ZONE AND SHEAR LAKE, 1981-1985***

| Year | Milled B-Zone | Output B-Zone | Reserves B-Zone | Milled Shear Lk | Output Shear Lk |
|---|---|---|---|---|---|
| 1981 | 9 kt | 14 kg | 278 kt @ 25 g/t Au | – | – |
| 1982 | 66 kt | 695 kg | 150 kt @ 17.0 g/t Au | | |
| 1983 | 102 kt | 1147 kg | 154.2 kg @ 17.14 g/t Au | | |
| 1984 | 52 kt | 450 kg | ? | 87.2 kt | 423 kg |
| 1985 | – | – | – | 82.1 kt | 407 kg |

*Source: Data mainly from Mining Inspections Service of the Government of the NWT. The reserves grade at B-Zone in 1981 was apparently overestimated. Geological reserves at Shear Lake are 1.5 Mt grading 7.9 g/t Au (personal communication, mine geologist)*

## CURRENT WORK AND RESULTS

A summary of production and reserves at B-Zone and Shear Lake since startup is given in Table 2-10.

In 1984, underground development at Shear Lake was accelerated as lower gold prices began to make mining at B-Zone unprofitable. By mid-year, operations had shifted entirely to Shear Lake. The price of gold continued to decline in 1985. By August of that year, operations at Shear Lake also proved unprofitable and the mine was forced to close. At that time, the ramp had been advanced to the 150-m level to exploit three main gold-bearing shears known as the 18, 19 and 21 veins.

## SILVER BEAR MINE

Terra Mines Ltd.
202, 7608-103 St.
Edmonton, Alta., T6E 4Z8

Silver
86 E/9
65°36'N, 117°57'W

### REFERENCES

Badham (1975); Brophy (1985); Hildebrand (1981b, 1983).

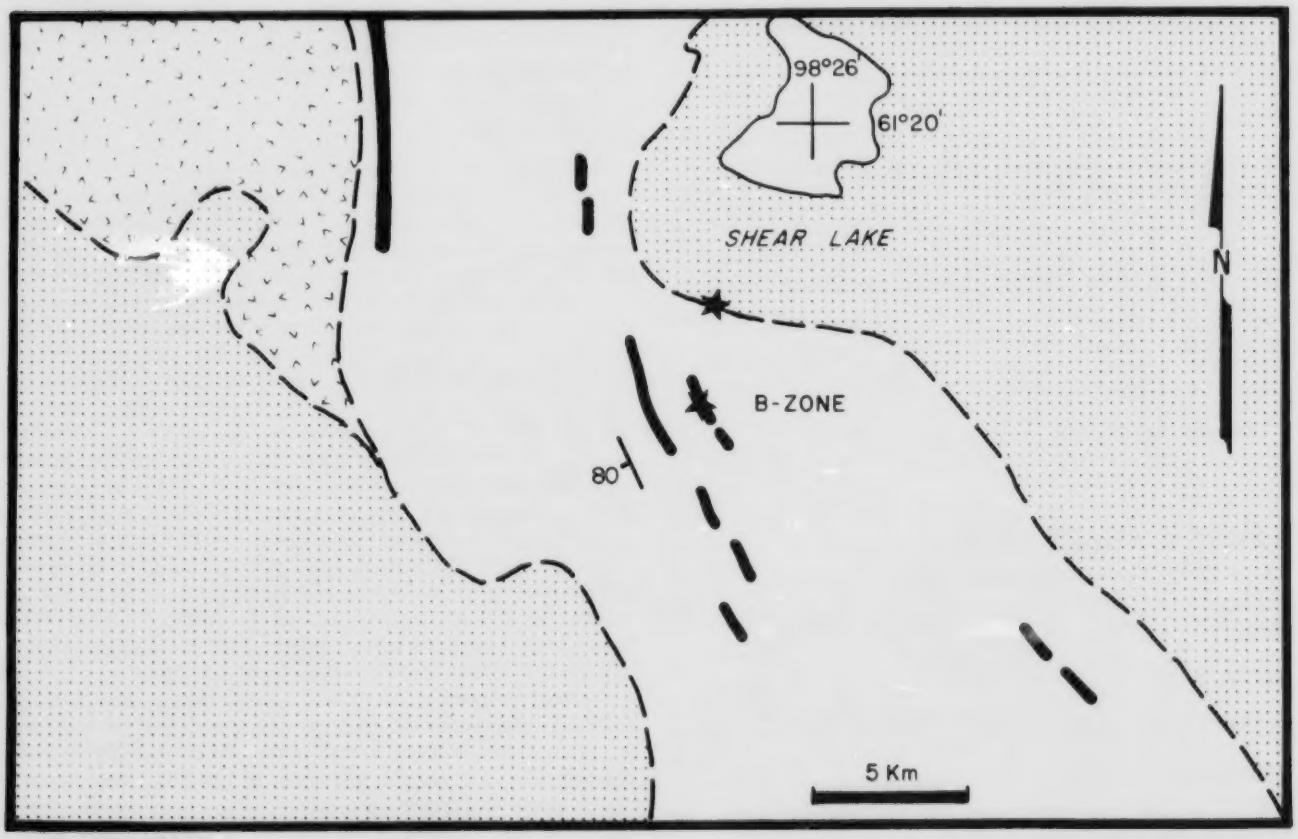


*FIGURE 2-6: Simplified geology of the Cullaton Lake area showing the positions of the B-Zone and Shear Lake orebodies (from Page, 1981).*

## PROPERTY

Nine A claims.

## LOCATION

Silver Bear is 405 km north-northwest of Yellowknife and is serviced by a gravel airstrip.

## HISTORY

The Silver Bear Mine is on property staked in the forties as the YAW group and drilled in the sixties by Eldorado Mining and Refining Limited and Echo Bay Mines Limited. The ground was restaked as the A group in 1966 and acquired by Silver Bear Mines Limited, the assets of which were taken over by Terra Mines Limited the following year. Mining commenced at Silver Bear in 1969 after considerable underground development and completion of a 270 tpd mill capable of producing separate silver-bismuth and copper-silver concentrates. Terra's other silver mines in the area (Norex, North & Smallwood; Brophy, 1985) did not operate in 1984 or 1985.

## DESCRIPTION

The Silver Bear Mine is on the southwest limb of the Norex Syncline near the north boundary of the Rainy Lake Intrusion (Fig. 2-7). It is hosted in the Terra Formation (formerly the Arden Formation of Hildebrand, 1981b), which consists of an upper member comprising lithic arkose, calc-argillite, conglomerate, siltstone and mudstone, and a lower member comprising mudstone, breccia, cherty tuff, lapilli tuff, siltstone and limy mudstone. Most ore is in the upper member, which in the mine area contains more than 10% banded and disseminated sulphides; mainly pyrite, pyrrhotite and chalcopyrite, but also cobalt-bismuth arsenides, native silver, argentite and native bismuth. Ore is concentrated in steeply to moderately south-dipping, northeast-striking, quartz-carbonate-hematite vein systems that cut the banded sulphides. Ore-bearing veins have also been mined in fractures in the Rainy Lake Intrusion, an epizonal syenite pluton to the south. The veins, which are considered magmatic-hydrothermal in origin (Badham, 1975), consist of silver-bearing pods surrounded by a thin halo of silicic, hematitic, chloritic and carbonate alteration.

## CURRENT WORK AND RESULTS

Declining silver prices forced Terra to operate the mill in a cut-back mode throughout most of 1984. Production from Silver Bear was obtained from several vein structures related to high-grade silver areas which were previously mined, thereby reducing development costs. Effective April 1, 1985, production at Silver Bear was suspended pending an improvement in silver prices. Production from Terra's silver mines in the area (Silver Bear, Norex and Smallwood) during the past decade is summarized in Table 2-11.

***TABLE 2-11: PRODUCTION; SILVER BEAR, NOREX AND SMALLWOOD, 1976-1985***

| Year | Kt Mined | Ag Output |
|---|---|---|
| 1976 | 41.5 | 58000 kg |
| 1977 | 33.2 | 45900 kg |
| 1978 | 33.6 | 46000 kg |
| 1979 | 26.9 | 13700 kg |
| 1980 | 27.9 | 9700 kg |
| 1981 | ? | 1800 kg |
| 1982 | 36.6 | 26717 kg |
| 1983 | 72.2 | 46654 kg |
| 1984 | 21.1 | 24620 kg |
| 1985 | 5.8 | 6746 kg |

** Source: Annual reports and Mining Inspection Service of the Government of the NWT.*

# PINE POINT MINE

Pine Point Mines Ltd.
Pine Point, NWT
X0E 0W0

Zinc, Lead
85 B/15, 16
N-42 deposit at:
60°50'50"N, 114°27'12"W

## REFERENCES

Campbell (1967); Gibbins (1983); Jackson and Beales (1967); Kyle (1980); Macqueen and Powell (1983); Rhodes (1981); Skall (1975).

## PROPERTY

4,476 leased claims as follows:

| LEASE | LOT | GROUP | CLAIMS |
|---|---|---|---|
| 2828 | | | 24 |
| 2851 | | | |
| 2878 | | | 994 |
| 2278 | 129 | 864 | 26 |
| 2280 | 130 | 864 | 32 |
| 2328 | 131 | 864 | 1 |
| 2329 | 575 | 814 | 816 |
| 2418 | 587 | 814 | 49 |
| 2419 | 601 | 814 | 30 |
| 2519 | 586 | 814 | 50 |
| 2553 | 646 | 814 | 68 |
| 2599 | 656 | 814 | 2 |
| 2600 | 657 | 814 | 5 |
| 2638 | 652 | 814 | 2 |
| 2639 | 588 | 814 | 124 |
| 2640 | 138 | 864 | 54 |
| 2641 | 139 | 864 | 22 |
| 2645 | 141 | 864 | 41 |
| 2646 | 142 | 864 | 19 |
| 2647 | 146 | 864 | 1 |
| 2648 | 147 | 864 | 1 |
| 2649 | 645 | 814 | 138 |
| 2650 | 600 | 814 | 8 |
| 2651 | 638 | 814 | 1 |
| 2652 | 649 | 814 | 8 |
| 2653 | 149 | 864 | 1 |
| 2654 | 150 | 864 | 3 |
| 2656 | 140 | 864 | 44 |
| 2657 | 594.1 | 814 | 97 |
| 2678 | 644 | 814 | 86 |
| 2679 | 653 | 814 | 72 |
| 2680 | 594.2 | 814 | 11 |
| 2681 | 151 | 864 | 2 |

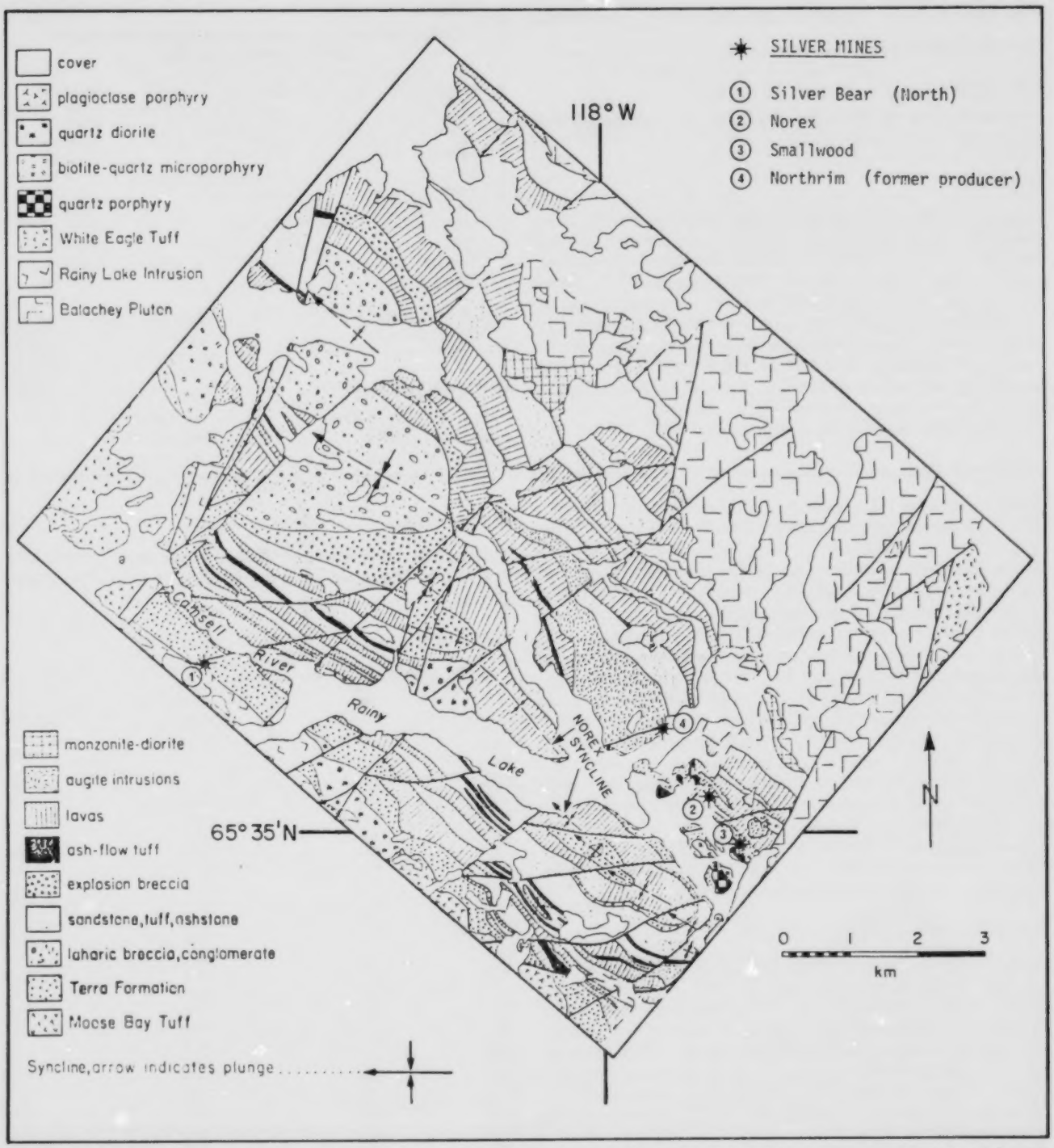


*FIGURE 2-7: Regional geology of the Camsell River area showing silver mines and the complex facies relations between various rock types in the Camsell River Formation (from Hildebrand, 1983).*

| LEASE | LOT | GROUP | CLAIMS |
|---|---|---|---|
| 2682 | 145 | 864 | 35 |
| 2683 | 659 | 814 | 77 |
| 2706 | 662 | 814 | 94 |
| 2790 | 665 | 814 | 15 |
| 2431 | 143 | 864 | 50 |
| 2432 | 640 | 814 | 111 |
| 2433 | 641 | 814 | 57 |
| 2330 | 137.3 | 864 | 27 |
| 2331 | 137.1 | 864 | 16 |
| 2279 | 137.2 | 864 | 115 |
| 2689 | 148 | 864 | 124 |
| 2776 | 639 | 814 | 6 |
| 2870 | 693 | 814 | 18 |
| 2871 | 694 | 814 | 12 |
| 2872 | 695 | 814 | 18 |
| 2892 | 698 | 814 | 754 |
| 2956 | 697 | 814 | 1 |
| 2957 | 697 | 814 | 115 |

## LOCATION

The claims form a block 53 km long and several kilometers wide on the south shore of Great Slave Lake, 120 km south of Yellowknife. A highway connects Pine Point to Hay River and a 1,370 m gravel airstrip is situated near the mill. A spur line of the Great Slave Railway provides concentrate and freight transport.

## HISTORY

Prospectors on their way to the Klondike goldfields were directed to sulfide outcrops near Pine Point by natives in 1898. Some claims were staked, but were allowed to lapse because only minor amounts of gold and silver were found. The area was examined again during the twenties, and in 1929 Northern Lead Zinc Company, formed with financing from Ventures Ltd. and Cominco, began a program that lasted two decades and included pitting and drilling. In 1948, a three-year concession of exclusive prospecting rights to 1295 km² was granted to these companies. Over 1000 claims were staked when the concession expired and a new company, Pine Point Mines Ltd. was formed to finance continuing work. Majority interest in Pine Point Mines Ltd. is held by Cominco. Construction of a government-financed, 677 km long railway from Roma, Alberta to Pine Point began in 1962. First ore from Pine Point was high-grade and was shipped in 1965, just prior to the completion of the mill. Reserves were bolstered by the acquisition of deposits from Pyramid Mining Co. in 1966 (X-15 and W-17 deposits), Coronet Mines Ltd. in 1972 (R-61 and S-65 deposits) and Conwest-Newconex Canadian Exploration in 1974 (A-55 deposit). The most recent exploration highlight was the 1981 discovery of the N-81 orebody (Fig. 2-8), which is the third largest orebody found on the Pine Point property at 2.7 Mt grading 21% combined lead-zinc. All production, except for underground test mining of the M-40 deposit, has been from open pits.

## DESCRIPTION

About 50 zinc-lead deposits (Fig. 2-8) have been found on the property within carbonates of the Pine Point Group (Fig. 2-9), a Middle Devonian (Givetian) barrier reef complex that separates deep-water carbonate and shale of the Mackenzie Basin to the north from back-reef evaporite deposits of the Elk Point Basin to the south (Kyle, 1980).

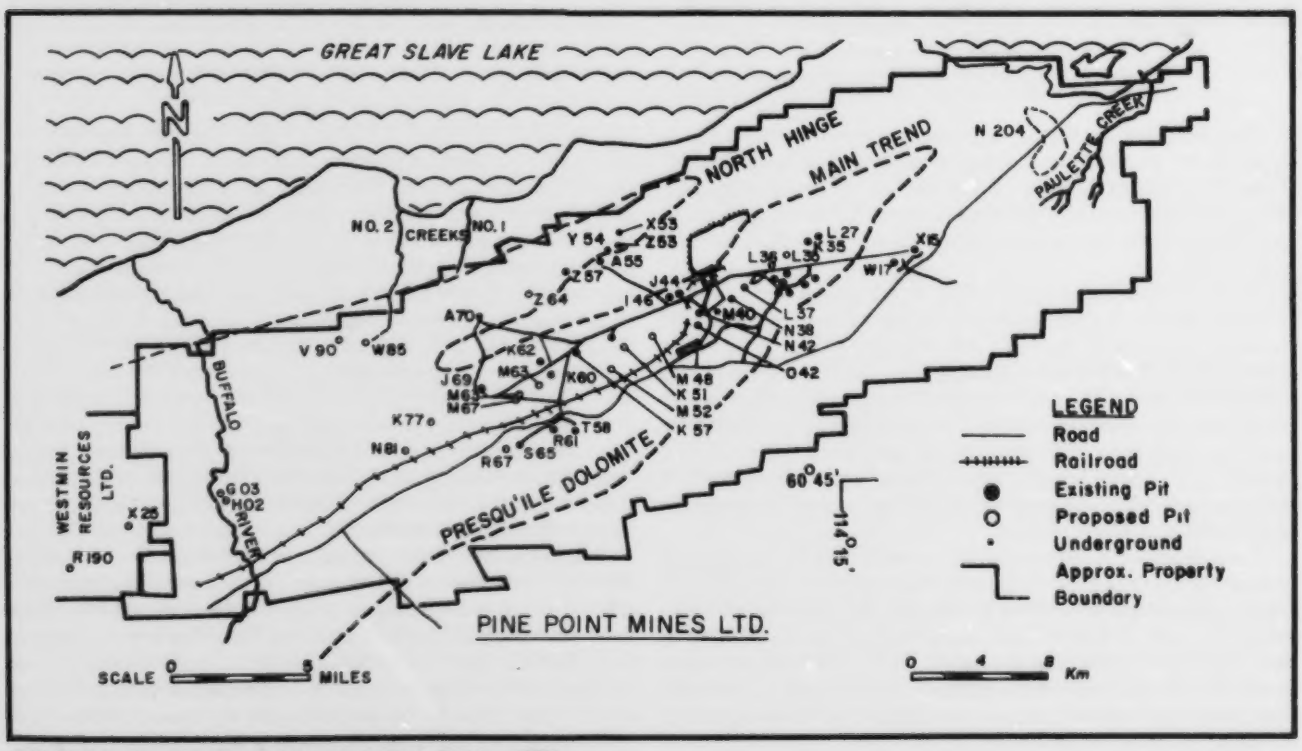


*FIGURE 2-8: Deposits, Pine Point property (from Gibbins, 1983).*

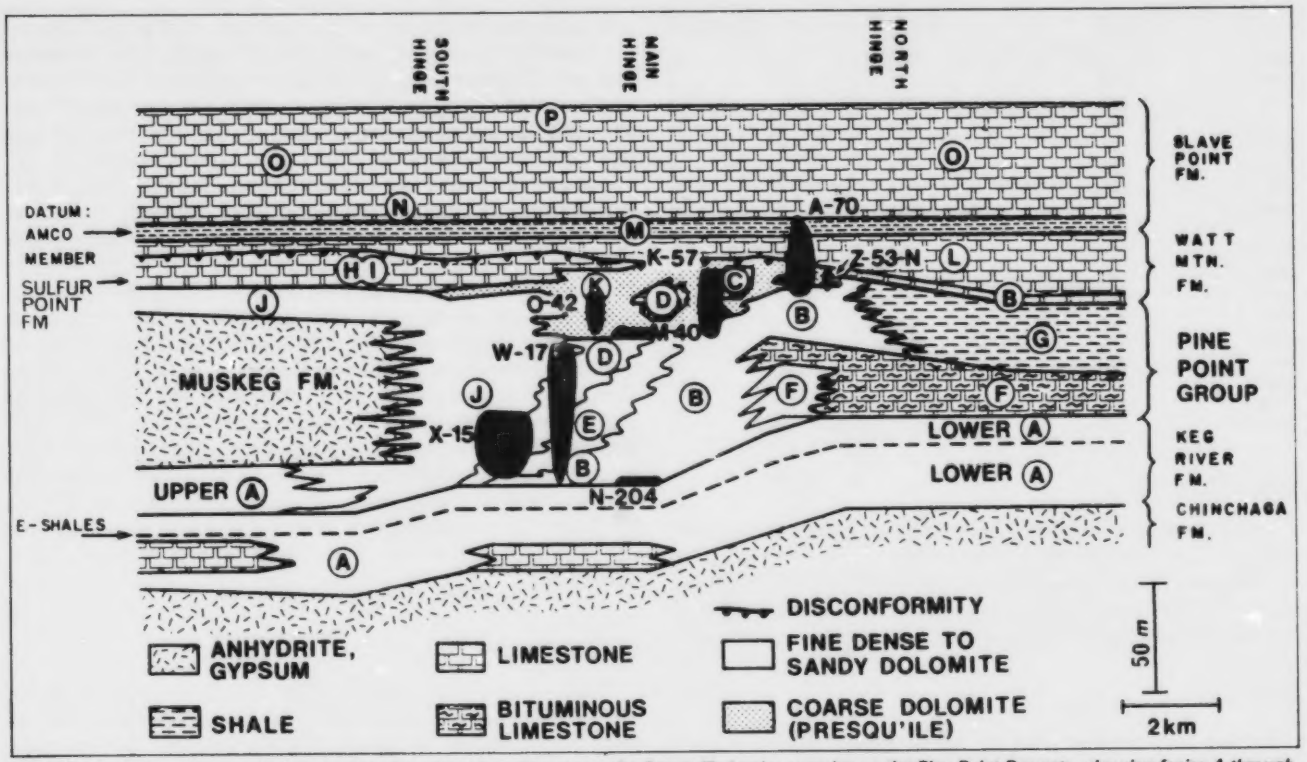


*FIGURE 2-9: Schematic west-facing, southeast-northwest section across the Presqu'ile barrier complex on the Pine Point Property, showing facies A through P and approximate locations of the major ore bodies as projected a single cross section. Highly generalized and modified from Kyle (1980); original facies designations environmental interpretations from Skall (1975). A-Keg River Formation; dolomite, variably argillaceous (marine platform). B through K-Pine Point Group. B-argillaceous dolomite (off-reef facies); C-micritic limestone (shallow fore-reef facies); D-sucrosic Dolomite, skeletal limestone (organic barrier facies); E-sucrosic dolomite (clean arenite facies); F-micritic, bituminous limestone (deep marine basinal facies); G-calcareous shale (Buffalo River Facies); H and I-micritic limestone (gastropod and Amphipora facies); J-sucrosic dolomite (back-reef facies); K-coarsely crystalline dolomite (Presqu-ile facies); L-Watt Mountain Formation, micritic limestone (green shaly facies); M through P-Slave Point Formation; M-limestone and shale (Amco Member); N-micritic limestone (tidal flat member); O-intraclastic limestone (shallow platform member); P-micritic limestone (deep platform member); (from Macqueen and Powell, 1983).*

Pine Point sulfide bodies range in size from less than 100 kt to as much as 14 Mt and occur at several stratigraphic positions in a 200 m section of the barrier complex (Fig. 2-9). Average metal content of the ore is about 5.8% zinc and 2.2% lead. The main gangue components are iron sulfides and carbonate.

Skall (1975) subdivided the Pine Point Group and adjacent formations into a number of ecological facies (Fig. 2-9) and showed that subtle tectonic adjustments along three hinge zones trending 065° were responsible for development of these facies. The North and Main Hinges (Fig. 2-8) coincide respectively with the southern limit of marine Facies G and the northernmost extension of a depositional tongue of Facies J. The South Hinge coincides with the northernmost evaporites of the Muskeg Formation. Most of the Pine Point orebodies are within the North and Main Hinges.

Karstification, a process that is considered important in preparing the host rock for mineralization (Beales and Jackson, 1968), is particularly evident below the erosional disconformity at the top of Sulfur Point Formation (Fig. 2-9). Many of the Pine Point orebodies (eg. M-40, O-42 and K-57 deposits) are at or near the base of the Sulfur Point Formation in karsted carbonate that has been altered to coarse-crystalline dolostone (Presqu'ile or K Facies of Fig. 2-9).

Two principle types of orebodies are present at Pine Point, tabular and prismatic (Rhodes, 1981). Tabular deposits are elongate, flat-lying orebodies associated with an interconnected network of karst channels mainly confined to the base of the Sulfur Point Formation along the North and Main hinges (eg. M-40 deposit of Fig. 2-9). Prismatic deposits are vertically elongate ore-bodies that formed when further dissolution in tabular karst zones caused sagging, foundering and collapse of the overlying strata. Prismatic ore bodies (eg. K-57 and O-42 deposits of Fig. 2-9) typically contain about 1 Mt or ore.

Some Pine Point orebodies are well below the base of the Sulfur Point Formation (eg. X-15 and W-17 deposits of Fig. 2-9) and are thought to have formed because continuing dissolution below tabular or prismatic orebodies allowed them to collapse into underlying strata (Rhodes, 1981). One of the largest deposits on the Pine Point property is N-81 (Fig. 2- 8), a collapsed prismatic orebody that was discovered in 1981.

The origin of the ore deposits at Pine Point is a subject of debate. Campbell (1967) suggested that mineralization was from thermal waters arising along the MacDonald-Hay River fault systems that underlie the Pine Point ore trend. Jackson and Beales (1967) identify the Pine Point orebodies as Mississippi Valley-type deposits and regard a genetic relation of the orebodies to basement faults as unwarranted. They postulated that mineralization was a result of normal evolution in a sedimentary basin. Metals were released by weather-

*TABLE 2-12: PRODUCTION AND RESERVES, PINE POINT, 1976-1986*

| | PRODUCTION | | | RESERVES | | |
|---|---|---|---|---|---|---|
| Year | Milled | Kt Zn | Kt Pb | Mt | grade Zn | grade Pb |
| 1976 | 3.42 Mt | 170 | 54 | 32.7 | 5.4% | 2.0% |
| 1977 | 3.12 Mt | 156 | 61 | 33.6 | 5.3% | 2.1% |
| 1978 | 2.98 Mt | 162 | 74 | 33.6 | 5.1% | 1.9% |
| 1979 | 2.99 Mt | 151 | 54 | 34.5 | 5.0% | 1.9% |
| 1980 | 3.29 Mt | 171 | 62 | 37.2 | 5.3% | 1.9% |
| 1981 | 3.30 Mt | 148 | 64 | 37.2 | 5.4% | 2.4% |
| 1982 | 2.22 Mt | 153 | 64 | 31.7 | 6.1% | 2.7% |
| 1983 | 0.89 Mt | 68 | 23 | 23.6 | 6.3% | 2.7% |
| 1984 | 2.28 Mt | 163 | 51 | 21.8 | 6.0% | 2.7% |
| 1985 | 2.14 Mt | 166 | 62 | 14.5 | 6.7% | 2.7% |

*Sources: Pine Point Mines Ltd annual reports.*

*TABLE 2-13: DEVELOPMENT, PINE POINT, 1983-1985*

| Year | Waste and Overburden Removal | Cost/t Milled | Strip Ratio | Exploration $ x $10^6$ | Line-km IP Surveys | Expl'n Drilling | Def'n Drilling |
|---|---|---|---|---|---|---|---|
| 1983 | 12.7 Mt | $28 | 12.7 | 2.4 | 97 | 35,052 m | 16,154 m |
| 1984 | 25.6 Mt | $27 | 12.4 | 3.7 | 349 | 49,072 m | 48,158 m |
| 1985 | 24.8 Mt | $31 | NR | 4.3 | NR | NR | NR |

*NR = not reported*
*Source: Pine Point Mines annual reports, 1983-1985.*

ing of continental rocks and were deposited with basinal shales as absorbed metal ions on clay minerals. Metals were released as soluble metal chloride and organic complexes during compaction and diagenesis. Metal-bearing brines migrated laterally into the permeable reef complex, travelling in the direction of lower hydraulic head. Reduction of sulphate derived from evaporitic strata in the Elk Point Basin, to the south of the Pine Point Barrier Reef, resulted in concentration of hydrogen sulphide in more permeable zones of the carbonate complex. Mixing of metal-bearing brines with reduced sulfur caused precipitation of metal sulfides.

## CURRENT WORK AND RESULTS

A ten-year summary of production and reserves at Pine Point is given in Table 2-12.

Development at Pine Point between 1983 and 1985 is summarized in Table 2-13.

### Pine Point 1984

In its 20th anniversary of production, Pine Point returned to profitability after two years of losses. This turnaround was due to higher lead-zinc prices and improved productivity. Mine production came from 7 pits on the North Hinge as well as from the N-81 prismatic ore body on the Main Trend (Fig. 2-8), which came on stream in July. Exploration was carried out mainly along the Main Trend west of the N-81 deposit. One prismatic orebody containing 203 kt grading 8.1% Zn and 3.9% Pb was discovered 11.3 km west of the concentrator. Exploration in the western part of the North Hinge, where mineralized rocks are 90 m below the surface, has shown signs of tabular ore zones of sufficient size and grade to warrant mining by underground methods. To test the feasibility of mining this ore, a $2 million underground mining program was started in the third quarter. By year-end, a decline from a pit wall had been advanced 320 m towards the underground orebody.

### Pine Point 1985

Pine Point was unprofitable in 1985 because of declining zinc-lead prices and higher costs (Table 2-13) incurred to dewater deeper pits and remove overburden from deeper ore bodies. Late in the year, production plans for 1986 and 1987 were announced that will reduce operating costs by increasing production rates from the best ore sources available, reducing the strip ratio and running the mill at full capacity. The revised plans involve processing 4.54 Mt of ore that are estimated to be economic even at the present depressed metal prices. Another 9.8 Mt of reserves could be mined profitably if metal prices improve. About 7 Mt of previously ore-grade material that now cannot be profitably mined were removed from the reserves. Given present metal prices, it is uncertain whether operations at Pine Point can be sustained beyond 1987.

Production in 1985 came principally from the N-81 orebody and three pits on the North Hinge, with a small amount of high-grade ore from the underground mine. During the third quarter, a decision was made to accelerate underground operations to maximize the output of high-grade ore. To reduce the growing impact of dewatering costs, a plan was formulated to construct an impervious barrier around the N-81 pit by injecting grout into the surrounding rock through surface boreholes. This project was abandoned when contractors failed to complete the job by the end of the construction season. Exploration in 1985 succeeded in adding nearly 1.8 Mt of ore grading 9.1% and 4.6% Pb to reserves. Most of this ore is in two tabular deposits (Z-60 and X-49) and an underground deposit (X-71) on the North Hinge, and in a prismatic deposit (P-24) on the east Main Trend. P-24, scheduled for development in 1986, is a shallow deposit containing 454 kt grading 7.6% Zn and 3.7% Pb.

# NANISIVIK MINE

Nanisivik Mines Ltd.
12th Floor,
20 Toronto St.
Toronto, Ont., M5C 2B8

Zinc, lead, silver
48 C/1
73°02'30"N, 84°28'30"W

## REFERENCES

Blackadar (1956, 1970); Brophy (1985); Clayton and Thorpe (1982); Jackson and Iannelli (1981); Lemon and Blackadar (1963); Olson (1984).

## PROPERTY

A claim, FISH 1-12, HB claim, 22 LION claims, LYNK 1-4.

## LOCATION

The Nanisivik Mine is south of Strathcona Sound on Borden Peninsula, northwestern Baffin Island. It is 27 km east of the community of Arctic Bay and is serviced twice a week by commercial jet flights from Montreal, 2000 km to the south. A marine wharf, just north of the mill on Strathcona Sound, accommodates ocean-going ships that carry concentrates to smelters during the short shipping season.

## HISTORY

Sulphides at Strathcona Sound were first observed by a Dominion Government Expedition in 1910. Some claims staked by prospectors in 1937 were allowed to lapse, but it was not until Blackadar (1956) reported on extensive base-metal-bearing pyrite zones that Texas Gulf Sulfur Co. Ltd. (TGS) began to investigate the area in earnest. In 1957, fifteen claims were staked to partly cover what proved to be the eastern end of the Main Orebody (Fig. 2-10).

In 1972, an option on the Strathcona Sound property was negotiated with Mineral Resources International. Watts, Griffis and McOuat Ltd., commissioned to do a feasibility study, recommended that the property be brought to production. Financing was arranged through agreements with TGS (now Kidd Creek Mines), Metallgesellschaft AG, Billiton BV and various banks. A development agreement was negotiated whereby the Government of Canada would obtain an 18% interest in the project for supplying infrastructure. In 1974, Strathcona Mineral Services was contracted to manage the project and Nanisivik Mines Ltd. was formed to operate the mine. Production began in 1976 at a rate of 1,420 tpd. Preproduction costs, excluding property acquisition and exploration, amounted to about $51 million.

## DESCRIPTION

The Nanisivik mine area on Borden Peninsula is underlain mainly by dolomite of the Society Cliffs Formation, the lowermost unit of the Neohelikian Uluksan Group, and locally by conformably overlying shales of the Victor Bay Formation (Lemon and Blackadar, 1963; Blackadar, 1970, Jackson and Iannelli, 1981; see Fig. 2-11). The Neohelikian strata are cut by Hadrynian diabase dikes, at least one of which is known to cut an orebody, thus establishing a pre-Hadrynian age for mineralization. Regionally, Nanisivik lies on a major west-northwest-trending graben, the long axis of which underlies and parallels Strathcona Sound (Clayton and Thorpe, 1982). The orebodies are in an area where subsidiary horsts and grabens have been superposed on this major structure. The strata in the mine area, where relatively undisturbed by faulting, strike easterly and dip gently to the north.

The ore bodies at Nanisivik are in the Society Cliffs Formation, which comprises slightly metamorphosed, algal laminated, brown-weathering, light grey to black dolostone that commonly emits a petroliferous odour when broken and contains sparsely disseminated blebs of bituminous material (Jackson and Iannelli, 1981).

Production from Nanisivik has been principally from the Main Orebody (Fig. 2-10) which comprises a main upper lens connected by subvertical sulphide keel zones to a number of smaller and less continuous lower lenses. The Main Lens, a tabular, horizontal ore body that extends sinuously for 3 km, is about 100 m wide and from 2 to 30 m thick. Typical ore consists of euhedral to subhedral sphalerite and galena with anhedral pyrite, sparry dolomite and ice as gangue. Flat layering in much of the Main Orebody is at a slight angle to the gently inclined beds of the hosting carbonates.

In addition to the Main Orebody, four other ore zones and a number of massive pyrite zones have been identified in the mine area (Fig. 2-11). Olson (1984) considers the orebodies to be Mississippi Valley-type (MVT) deposits, although the age, geological setting, and high silver and iron contents of the Nanisivik orebodies are atypical of MVT deposits (Brophy, 1985).

## CURRENT WORK AND RESULTS

A summary of production and reserves at Nanisivik from 1977 to 1985 is given in Table 2-14.

### Nanisivik 1984

During 1984, Mineral Resources International (MRI) increased its interest in Nanisivik Mines to 70.75% by purchasing the 6.5% interest held by Kidd Creek Mines and the 11.25% interest held by Metallgesellschaft Canada Ltd. The remaining interest is held by the Government of Canada (18%) and Billiton Canada Ltd. (11.25%).

During the year a number of areas were mined. Work in the Main Lens was concentrated on the east end of the deposit as part of a long-term plan to mine from east to west and allow pillar recovery to commence in the near future. Mineralized zones beneath the Main Lens continue to be developed, but ore continuity is inconsistent and does not allow a high rate of mining from this area. Mining of the Area-14 satellite orebody (Fig. 2-10) commenced during the year; about half of the original reserves, 200 kt of good-grade ore, were mined.

Modest additions were made to ore reserves around the periphery of the Main Orebody, but the potential for further significant additions here is considered limited.

The Shale Hill deposit (Fig. 2-10), which contains 200 kt of good-grade ore, will be mined in the future. The Ocean View

*FIGURE 2-10: Main sulphide zone at Nanisivik (from Mineral Resources International Annual Report, 1985).*

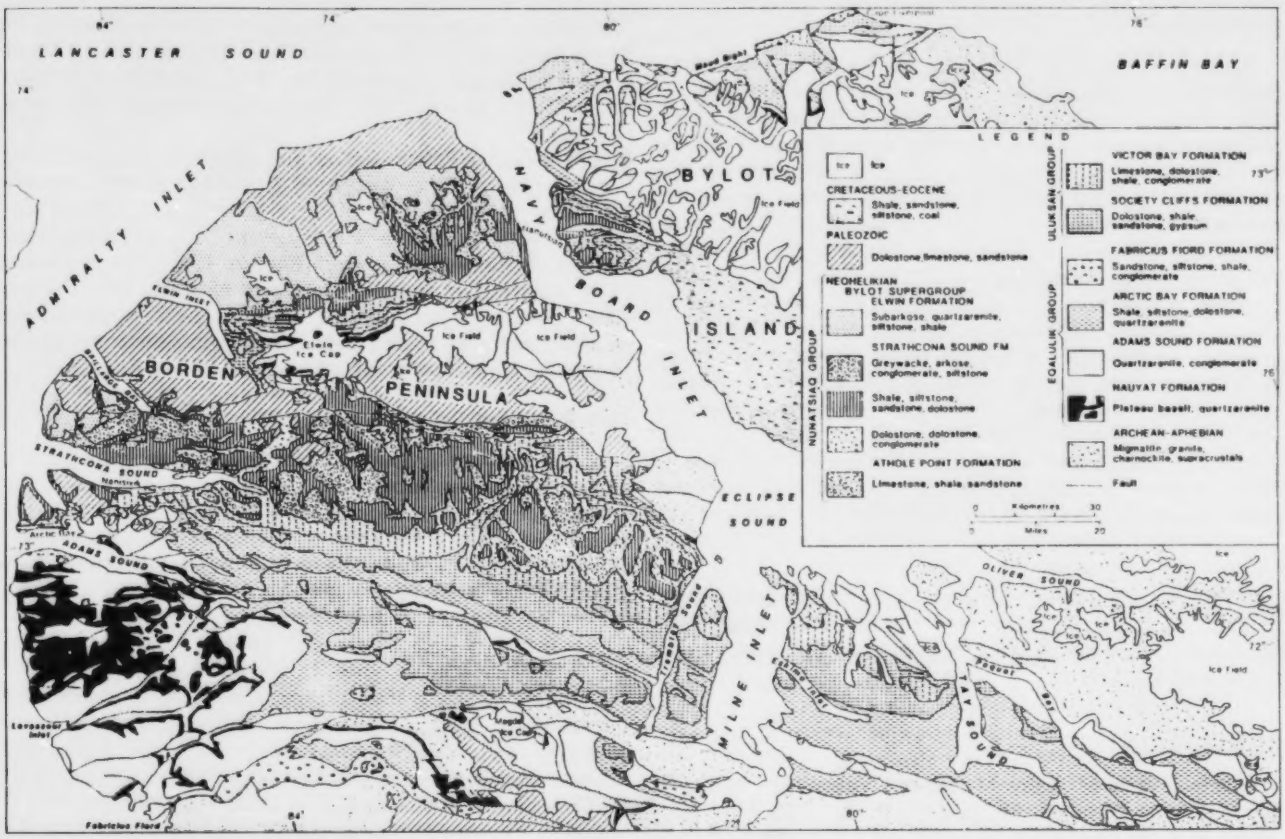


*FIGURE 2-11: Regional geology, Borden Basin. Nanisivik is shown south of Strathcona Sound at about 73°N latitude and 85°W longtitude (from Jackson and Iannelli, 1981).*

***TABLE 2-14: PRODUCTION AND RESERVES, NANISIVIK, 1977-1985***

| | PRODUCTION | | | RESERVES | | |
|---|---|---|---|---|---|---|
| Year | kt milled | kt Zn | kt Pb | kt | % Zn | % Pb |
| 1977 | 525 | 68 | 10.8 | 6350 | 13.2 | 1.4 |
| 1978 | 575 | 73 | 7.2 | 5300 | 11.6 | 1.3 |
| 1979 | 615 | 76 | 7.6 | 3250 | 11.9 | 1.2 |
| 1980 | 435 | 64 | 10.3 | 3250 | 12.0 | 1.1 |
| 1981 | 624 | 68 | 8.3 | 3580 | 10.3 | 0.8 |
| 1982 | 622 | 75 | 9.4 | 4400 | 11.0 | 1.5 |
| 1983 | 628 | 61 | 6.4 | 3800 | 10.0 | 0.8 |
| 1984 | 693 | 68 | 7.0 | 3150 | 9.5 | 0.5 |
| 1985 | 693 | 61 | 5.1 | *2460 | 9.5 | 0.5 |

*Sources: thoughput and base-metal ouput from Mining Inspection Service of the Government of the NWT. Reserves and grade from Mineral Resources International annual reports.*
*Note: Nanisivik ore also contains about 40-50 g/t silver.*
**Note: 1985 reserves are estimated.*

deposits (Fig. 2-10), which contain 200 kt grading 6% Zn, may be mined if zinc prices improve.

**Nanisivik 1985**

Nanisivik reduced zinc production by not shipping about 15,000 t of available zinc concentrate and by mining lower-grade ore in the latter part of the year. This strategy of curtailing production during times of low zinc prices is possible because Nanisivik is relatively debt free.

## POLARIS MINE

Cominco Ltd.
Northern Group
Precambrian Building
Yellowknife, NWT

Zinc, Lead
68 H/8
Deposit at:
75°23'42"N, 96°56'00"W

### REFERENCES

Kerr (1977a, 1977b); Muraro (1973); Scales (1982).

### PROPERTY

POLARIS 1-21.

### LOCATION

The Polaris Mine is at the southwest extremity of Little Cornwallis Island, 1700 km north-northeast of Yellowknife and 100 km north-northwest of Resolute on Cornwallis Island. Supplies and personnel are flown to an airstrip at the mine site from Resolute, which is regularly serviced by commercial flights f.om Montreal (Nordair) and Yellowknife (Pacific Western Airlines). A wharf on Crozier Strait at the mine site accommodates ocean-going ships that carry nonperishable supplies to the mine and concentrates to smelters.

## HISTORY

Geologists mapping oil permits for Bankeno Mines Ltd. discovered galena and sphalerite on Little Cornwallis Island in 1960. Between 1961 and 1963, Bankeno drilled and staked ground covering the Polaris deposit. The claims were optioned to Cominco in 1964, and geological mapping, surface diamond drilling and geochemical surveying were carried out between 1964 and 1966. A geophysical survey in 1970 detected a coincident gravity and IP anomaly. The anomaly was drilled in 1971, and 16 Mt of ore grading 20% combined lead-zinc was outlined. A new company, Arvik Mines Ltd., was formed to develop the Little Cornwallis properties. Encouraging results from further drilling in 1972 led to underground development in 1972-73 to obtain a bulk sample and to confirm continuity of the orebody and viability of mining in permafrost. Extensive underground drilling established reserves estimated at 23.0 Mt grading 14.1% Zn and 4.3% Pb. After feasibility studies in 1979, Cominco and Bankeno decided to dissolve Arvik Mines and bring the Polaris deposit to production. The orebody was turned over to Cominco under an agreement in which Bankeno Mines retains an option on a royalty interest.

In 1981, the mill and office complex, which was constructed at Trois Riveres in Quebec, was erected on a barge and floated to the mine site. First ore was fed into the mill on November 4, 1981.

## DESCRIPTION

Polaris is one of many Mississippi Valley-type lead-zinc deposits in the Cornwallis Pb-Zn District (Fig. 2-12), which corresponds to the northernmost part of the Cornwallis Fold Belt, a north-trending, north-plunging anticlinorium, extending more than 650 km from the Precambrian Shield to the Sverdrup Basin (Kerr, 1977a). The fold belt was formed in response to four main pulses of differential vertical uplift during the Silurian and Devonian. The Ordovician Thumb Mountain Formation, which comprises limestone and minor dolomite and hosts all of the significant Pb-Zn deposits in the Cornwallis District, was subjected to erosion and karstification during the third pulse of uplift in early Devonian time (Kerr, 1977a). The deposits are stratabound, hosted in brecciated dolostone (rather than the usual limestone of the Thumb Mountain Formation) and are close to shale of the overlying Cape Phillips Formation (Fig. 2-13), which may have been the source for metals (Kerr, 1977b).

The Polaris deposit is on the western limb of a broad, north-trending syncline and is in the upper approximately 75 m of dolomitized Thumb Mountain Formation carbonates. The Thumb Mountain Formation is about 520 m thick at Polaris and the upper mineralized zone is characterized by abundant thin-shelled fossil debris. The Thumb Mountain Formation is overlain successively by about 61 m of nodular limestone and green shale of the Irene Bay Formation and by dark-coloured silty calcareous shale of the Cape Phillips Formation, which is only partly preserved beneath an unconformity (Fig. 2-13). Strata strike north-northwesterly and dip 8° to 15° east. The Polaris deposit is about 350 m long in a northwesterly direction and about 150 m wide. In cross-section (Fig. 2-14), the deposit is pan-shaped and comprises the upper Panhandle Zone, about 5 to 40 m thick and beginning about 100 m below surface (50 m below sea level), and the lower Keel Zone, about 100 m thick and beginning about 200 m below surface (125 m below sea level). The Panhandle Zone contains about 4 Mt of ore and the Keel Zone about 21 Mt. Ore grade is about 14% Zn and 4% Pb (Cominco public information circular, "Welcome to Polaris").

Sulfides in the Polaris deposit include sphalerite, galena and about 5-10% pyrite or marcasite. Sphalerite is colloform except where it has crystallized to partly fill vugs in massive sections of sulfide. Galena is medium to coarse grained; iron sulfides are mainly fine grained (Muraro, 1973). The entire ore body is estimated to have a porosity of about 5% (Scales, 1982). Voids are filled with fresh-water ice, so the deposit must be exploited by dry mining techniques at sub-zero temperatures to prevent deterioration of ground conditions.

## CURRENT WORK AND RESULTS

A summary of production and reserves at Polaris since startup is given in Table 2-15.

Much of the production in 1984 was from primary stopes in the Panhandle Zone, but by March of 1985 the primary stopes were mined out and production in the Panhandle Zone was from the recovery of pillars. In January of 1985, mining operations moved into the southern part of the Keel Zone, which supplied 90% of the mill feed in 1985 and is now (Apr. 1986) developed down to the 760-m level (Fig. 2-14).

Diamond drilling in 1984 increased measured and indicated ore reserves by 18% (Table 2-15). Exploration in 1985 was limited to establishing the east boundary of the Keel Zone and drilling some fill-in holes. Improvements in operating practices in 1985 resulted in an increase in milling capacity from 819 kt to 939 kt. Polaris was shut down for several weeks during the Christmas holiday season in 1984 and 1985.

***TABLE 2-15: PRODUCTION AND RESERVES, POLARIS, 1981-1985***

| | PRODUCTION | | | RESERVES | | |
|---|---|---|---|---|---|---|
| Year | kt mined | kt zinc | Kt lead | kt reserves | % Zn | %Pb |
| 1981 | 26 | 3.4 | 1.1 | — | | |
| 1982 | 470 | 74 | 30.2 | 9,980 | 15.2 | 4.4 |
| 1983 | 829 | 132.2 | 38.9 | 16,870 | 14.8 | 4.1 |
| 1984 | 847 | 110.5 | 28.4 | 19,958 | 14.3 | 3.8 |
| 1985 | 936 | 117.8 | 30.0 | 19,000 | 14.3 | 3.8 |

*Source: mill throughput and output from Minining Inspection Service of the Goverment of the NWT. Reserves from Cominco annual reports. Note: throughput of 819 kt in 1984 and 939 kt in 1985 (Cominco Annual Reports) differs slightly from throughput reported by Mining Inspection Service.*

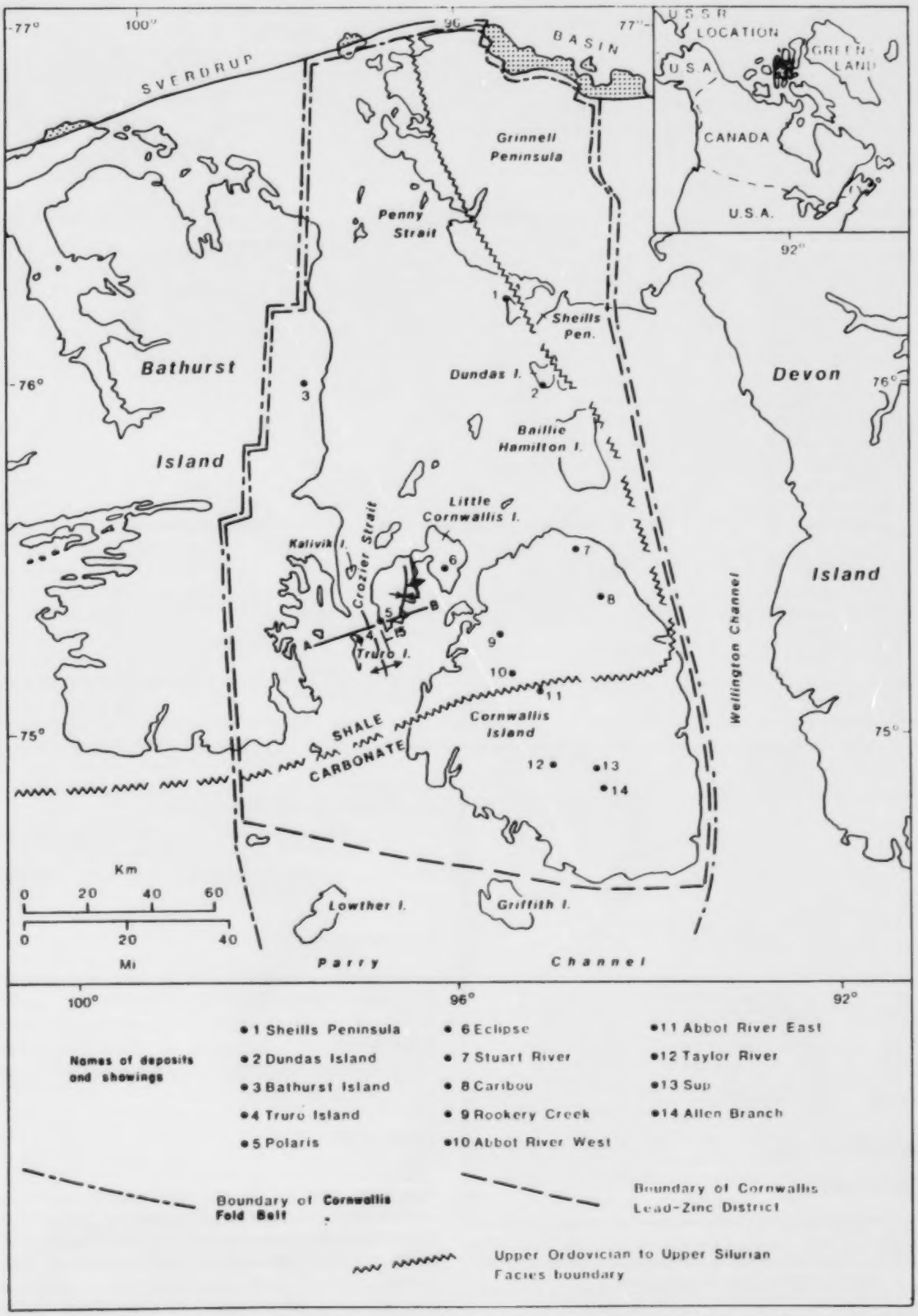


*FIGURE 2-12: Index map showing lead-zinc deposits of the Cornwallis District. AB is the approximate section of Figure 2-13 (from Kerr, 1977b).*

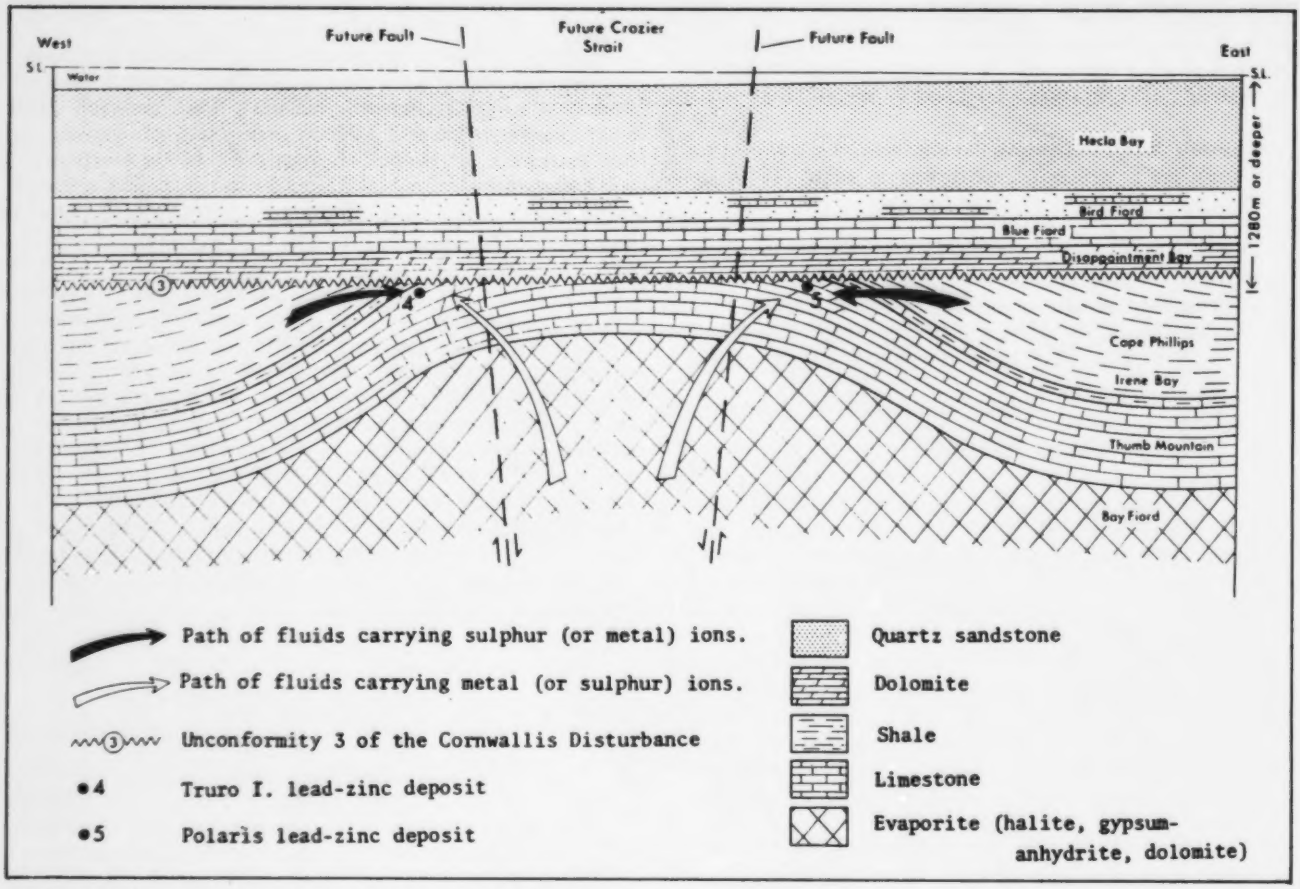


*FIGURE 2-13: Reconstructed section along AB of Figure 2-12 showing the stratigraphic position of the Truro Island and Polaris deposits (from Kerr, 1977b).*

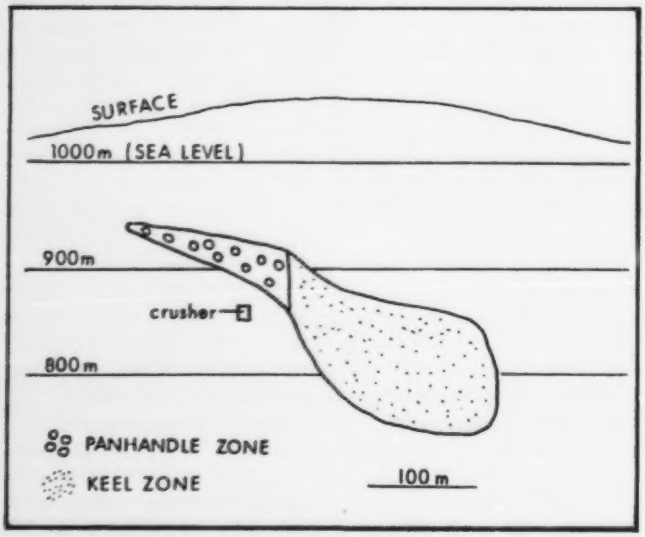


*FIGURE 2-14: North-facing cross section showing the shape of the Polaris deposit, Panhandle Zone and Keel Zone (from Cominco information brochure "Welcome to Polaris")*

## CANTUNG MINE

Canada Tungsten Mining Corp. Ltd.
P.O. Box 9 Tungsten, NWT X0A 0A0

Tungsten
105 H/16
61°58'N, 128°15'W

### REFERENCES

Cummings and Bruce (1977); Dick and Hodgson 1982); Gabrielse and others (1973); Zaw and Clark (1978).

### PROPERTY

AC 1-7; BC 1-8, 10-11; CED 59-65, 67-73; EF 2, 5-8; RL 1, 3-5, 8-10, 19-20; WO 1-11.

### LOCATION

Cantung is near the headwaters of Flat River in the Selwyn Mountains, 644 km west of Yellowknife and less than 3 km east of the Yukon border. The town of Tungsten is serviced by a 306 km all-weather gravel road from Watson Lake, 209 km to the south in the Yukon Territory, and a 1219 m gravel airstrip.

## HISTORY

A skarn in the floor of a mountain cirque at an elevation of 1524 m was discovered and staked as a copper prospect for Northwestern Explorations Ltd. in 1954. After exploration and drilling, the copper potential was deemed subeconomic and in 1958 the claims were allowed to lapse. Aware of scheelite in the deposit, the Mackenzie Syndicate immediately restaked the claims and Canada Tungsten Mining Corporation was formed to acquire and develop the property. Exploration indicated about 1 Mt grading 2.47% $WO_3$ recoverable by open pit mining, which began in November of 1962. In 1970, exploratory drilling outlined a new ore zone (E-Zone) 550 m north of and 122 m below the open pit. Open-pit mining was phased out in 1974, when year-round underground operations began. Expansion of the mill was completed in 1979, doubling capacity from 450 tpd to 900 tpd and making Cantung the largest tungsten mine in the Western Hemisphere.

## DESCRIPTION

The main regional structure in the Cantung area is a northwest-trending syncline cored by Cambrian limestone, flanked by Cambrian or earlier phyllite and intruded by Cretaceous quartz monzonite stocks (Fig. 2-15). At Cantung, the "Mine Stock" has altered some of the limestone to ore-bearing skarn.

The following description is mainly after Dick and Hodgson (1982). Ore-bearing skarns at Cantung are found in two distinct lithological units: the Ore limestone, which contains the bulk of the ore, and the Swiss Cheese limestone (Fig. 2-16). The Ore limestone is a relatively pure, 70 m thick, coarsely crystalline, massive marble of Lower Cambrian age (Blusson, 1968). The underlying Swiss Cheese limestone is an equally thick unit comprising calcareous rock enclosed in a non-calcareous pelitic matrix. Only the calcareous component is significantly altered to skarn which, when mineralized, is termed "chert ore" by Cantung geologists. The Ore and Swiss Cheese limestones are sandwiched between fine-grained, brown hornfels units known as the Upper and Lower Argillite. This sequence has been deformed into a recumbent anticline and slightly displaced by high-angle faults.

There are two separate orebodies at Cantung; the open pit orebody and the E-Zone orebody. The open pit orebody, on the gently-dipping upper limb of the anticline, is in both the Swiss Cheese and Ore limestone. The E-Zone orebody, on the flat-lying lower limb of the anticline adjacent to the contact with the Mine Stock, is mainly in the Ore limestone (Fig. 2-16). The thickness and grade of ore in the E-Zone orebody diminishes rapidly as the dip of the beds steepen towards the hinge of the anticline.

The pit orebody, now mined out, was a shallowly southwest-dipping lens about 91 m wide and 20 m thick, cut by quartz-microcline-scheelite veins and altered to a fine-grained clinopyroxene-garnet skarn containing pyrrhotite, scheelite, chalcopyrite and sphalerite. The Swiss Cheese limestone (chert ore) was lower grade and contained scheelite and pyrrhotite.

The E-Zone orebody is over 600 m long and typically 12 m thick by 60 m wide. Zaw (1976) showed that the E-Zone has an internal zoning broadly conformable to stratigraphy and comprising an upper zone of hedenbergite pyroxene and Fe-Mn-rich grossular, an intermediate amphibole-rich zone and a footwall biotite skarn. The E-Zone orebody contains scheelite, chalcopyrite, sphalerite, and non-magnetic pyrrhotite.

The Mine Stock is a quartz monzonite intrusion enveloped by an extensive thermal metamorphic aureole. It ranges from equigranular and porphyritic in texture and consists mainly of microcline, quartz, plagioclase and biotite. Quartz veinlets containing minor pyrite, arsenopyrite, scheelite and tourmaline are abundant in the stock near the skarn contacts.

Conversion of Ore limestone to skarn is considered to have taken place over a short period at a shallow depth (1000 bars) and at a temperature of 450°C. The locus of skarnification and mineralization is thought to have migrated towards the roof of the Mine Stock as it cooled (Zaw and Clark, 1978).

## CURRENT WORK AND RESULTS

A ten-year summary of production and reserves at Cantung is given in Table 2-16. Operations resumed in 1984 after a 10.5-month shutdown the previous year. Productivity was comparable to previous complete years of operation, despite a 20% reduction in the number of employees, because of the introduction of bulk-mining procedures using large-diameter blast holes. Productivity was further enhanced by using remote-control load-haul-dump equipment and a new hydraulic backfill plant.

Underground diamond drilling (11,242 m) was carried out up to 210 m west of the previously defined orebody, and deposits of mineable grade were defined. Underground development included 1242 m of drifting and 242 m of raising.

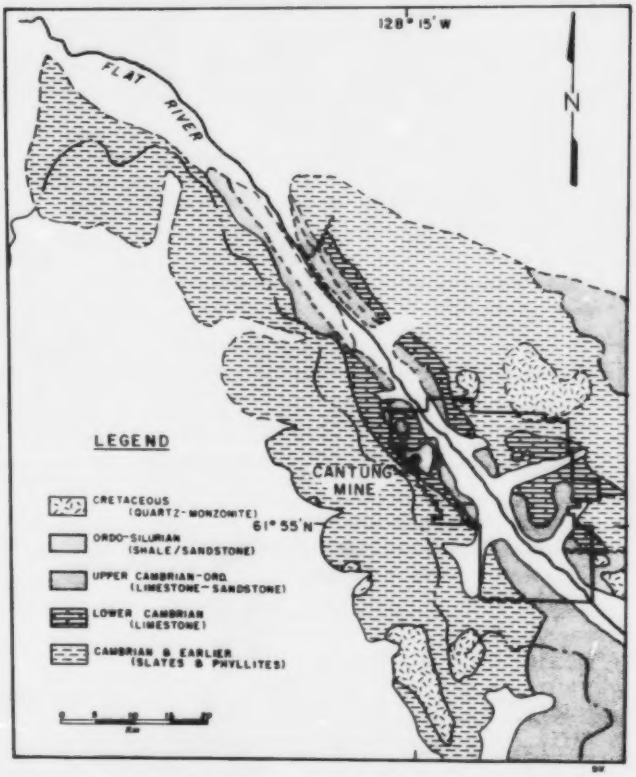


*FIGURE 2-15: Regional geology, Cantung Mine area (from Gabrielse and others, 1973)*

A million dollars was spent on surface exploration, mainly near the mine. This work included sampling, mapping, surveying and the drilling of one 900-m hole.

Underground exploration to the west of the existing orebody continued in 1985, although no surface exploration was done. In the latter half of 1985, a new management team for mine operations was organized and a revised mine plan was completed by J.S. Redpath Ltd. Based on work done by that company and the engineering staff of Canada Tungsten, the estimate of mineable ore reserves was reduced by almost 50% (Table 2-16).

***TABLE 2-16: PRODUCTION AND RESERVES, CANTUNG MINE, 1976-1985***

| | PRODUCTION | | RESERVES | |
|---|---|---|---|---|
| Year | kt milled | kt $WO_3$ | kt reserves | grade % $WO_3$ |
| 1976 | 170 | 2.2 | 3800 | 1.55 |
| 1977 | 165 | 2.3 | 3810 | 1.55 |
| 1978 | 175 | 2.9 | 3810 | 1.55 |
| 1979 | 245 | 3.3 | 3540 | 1.55 |
| 1980 | 317 | 4.0 | 3270 | 1.55 |
| 1981 | 215 | 2.5 | 3220 | 1.50 |
| 1982 | 328 | 3.6 | 2750 | 1.32 |
| 1983 | 36 | 0.35 | 2700 | 1.32 |
| 1984 | 307 | 3.5 | 2540 | 1.39 |
| 1985 | 346 | 3.7 | 1360 | 1.24 |

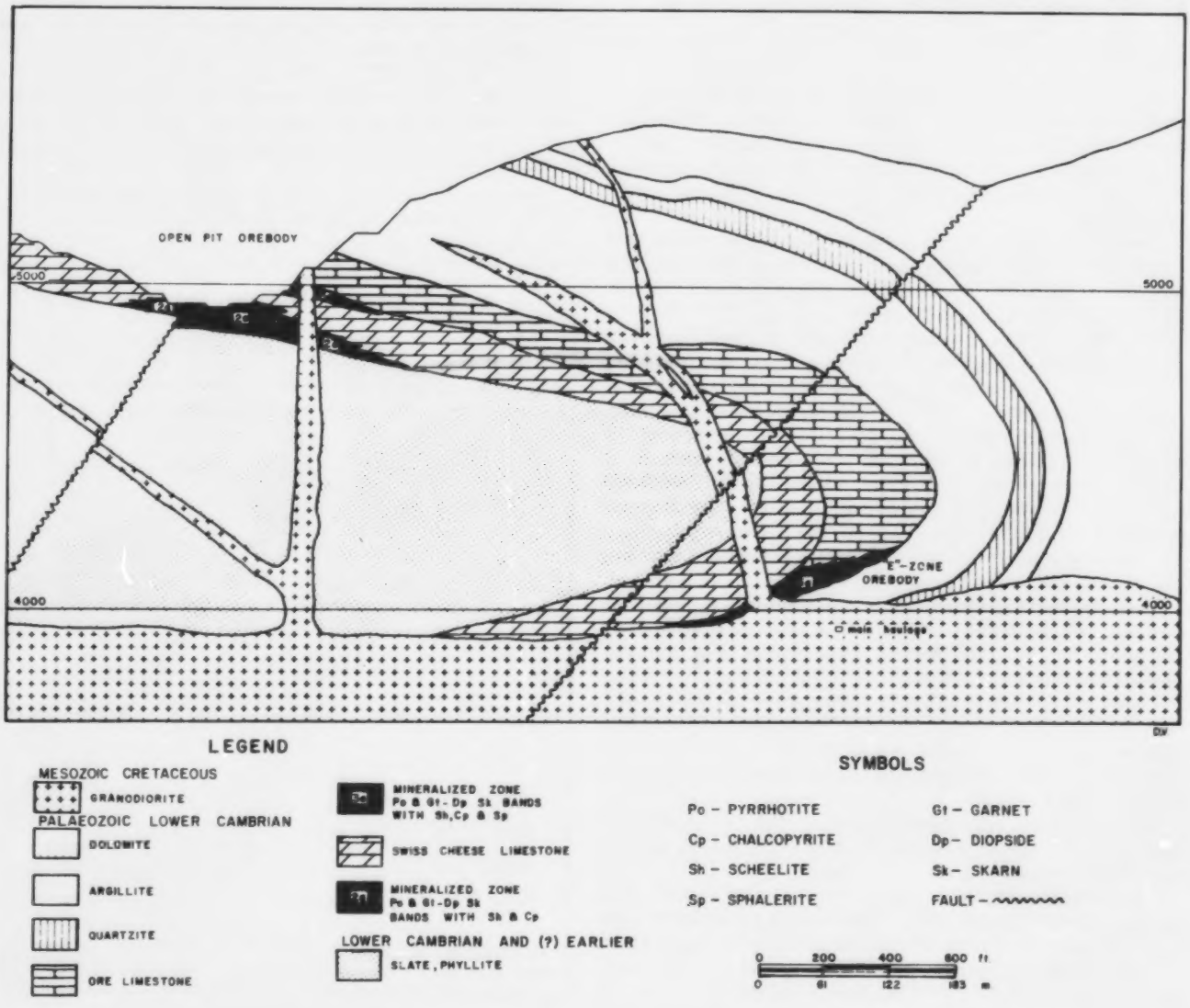


*FIGURE 2-16: Typical geological cross section, Cantung Mine (after Cummings and Bruce, 1977)*

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# CHAPTER 3
# CORDILLERAN DISTRICT

**J.A. Brophy**
**Cordilleran District Geologist**

The Cordilleran District extends from the Mackenzie Delta south to 60°N latitude and from the mountains just east of the Mackenzie River to the Yukon Border. It comprises mainly the Northwest Territories part of the Cordilleran Orogen.

There was little exploration in 1984 and 1985 (Fig. 3-1) because markets were supressed for those mineral commodities (tungsten, zinc, lead and cobalt) that are the main exploration targets in this part of the Cordillera. Only 14 assessment reports were submitted documenting exploration work done in 1984. These described work done on prospects for tungsten skarns (5 reports), auriferous skarns (1 report), placer gold (6 reports), auriferous veins (1 report) and carbonate-hosted zinc-lead-silver deposits (1 report). At the time of writing (April, 1986), only one report had been submitted

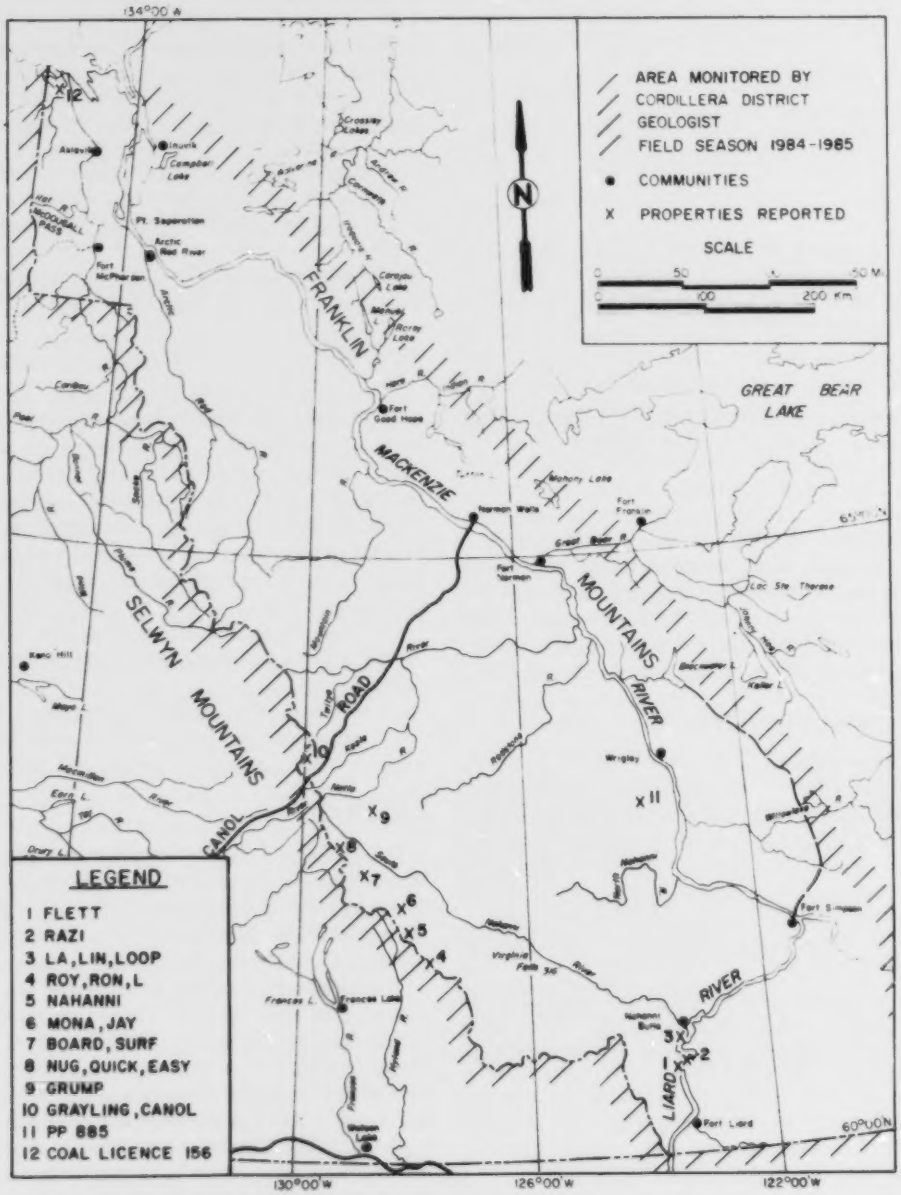


*FIGURE 3-1: Active properties in the Cordilleran District, 1984-1985.*

documenting work done in 1985. This report was for a syngenetic-exhalative zinc-lead-silver prospect. Additional reports for 1985 work will be summarized in the next volume of the Mineral Industry Report. Synopses of previously unreported work done on a coal licence in 1982 and on a placer gold prospect in 1983 are also included in this chapter.

The sequence of properties described is in order of increasing NTS number.

## RAZI CLAIMS

David Smith
Box 2315
Yellowknife, NWT,
X1A 2P7

Gold
95 B/11
60°45'N, 123°21'W

### REFERENCES

Hawes (1980); Lord (1983).
DIAND assessment report: 081726.

### PROPERTY

RAZI 1-2 (166 ha).

### LOCATION

The claims are about 60 km north of Fort Liard and within 1 km of the Liard Highway (Fig. 3-1).

### HISTORY

The claims were staked in 1980 to cover auriferous gravel bars in the Liard River reported by Lord (1983).

### DESCRIPTION

The claims are underlain by alluvial gravel, sand and silt of the Liard River flood plain. The closest outcrops to the east are marine shales and thin-bedded sandstones of the Cretaceous Fort St. John Group, and to the west are upper Paleozoic limestones and shales of the Flett Formation. These are cut by a series of north-striking thrust faults (Hawes, 1980).

### CURRENT WORK AND RESULTS

In 1983, 13 pits were excavated on a point bar on the west side of the river. About 0.06 $m^3$ of material was removed from each pit. This material was mixed, collected in 4000 $cm^3$ boxes, and sieved through a 20 mesh screen. An estimate of the sand and silt fraction was made and half the sieved material was bagged for assay. The other half was pan-assayed by counting gold grains and classifying the grains according to size: large, greater than 0.4 mm; medium, between 0.1 and 0.4 mm; and small, less than 0.1 mm.

Of thirteen assays, twelve were less than 0.1 ppm and one was 0.1 ppm. The pan assay for this latter sample was 2 large grains and 1 small grain. Gold grains were found in all pan assays.

## FLETT, LA, LIN, LOOP, NET CLAIMS LIARD RIVER RECONNAISSANCE

Hudson Bay Mining &
Smelting Co. Ltd.
P.O. Box 28,
Toronto-Dominion Ctre,
Toronto, Ont., M5K 1B8

Gold
95B/12,13,14
60°53'N, 123°30'W

### REFERENCES

Camsell and Malcolm (1921); Dawson (1889); Hage (1945); Hawes (1980); Hume (1923); Lord (1983);McConnel (1890); Turner (1975).

DIAND assessment reports: 081920 to 081925.

### PROPERTY

FLETT 1-2 (1337.6 ha), LA-1 (334.4 ha), LIN-1 (334.4 ha), and LOOP 1-6 (1463 ha).

### LOCATION

The claims cover parts of an 80 km long, meandering stretch of the Liard River north of Flett Rapids and south of Nahanni Butte. The straight-line distance from the southernmost FLETT claims to the northernmost LIN claim is only 25 km. The claims are all within 3 to 15 km of the all-weather road that parallels the Liard River and links Fort Liard to Fort Simpson.

### HISTORY

The Liard River area was selected by Hudson Bay Mining and Smelting Co. Ltd. for placer gold exploration on the basis of a reconnaissance gold sampling program by Lord (1983). However, placer gold on the Liard River was reported as early as the late eighteen hundreds (Dawson, 1889; McConnel, 1890). Turner (1975) describes a 1935 venture in which 622 g of gold were recovered from Liard River point bars. Small scale gold mining continues today on several Liard River claims (Lord, 1985).

Geological investigations along the Liard River were conducted by Camsell and Malcolm (1921), Hage (1945) and Hume (1923).

The Hudson Bay claims were staked in 1983 to cover the most favourable ground identified after a reconnaissance sediment sampling program conducted that year.

### DESCRIPTION

The reconnaissance area is within the flood plain of the Liard River between Nahanni Butte and Flett Rapids. The valley in this area is up to 8 km wide. Outcrops of shale, carbonate and coarse-grained clastics of Devonian to Cretaceous age are restricted to road cuts and to the valleys of tributary streams.

The oldest unconsolidated deposits are clay-rich glacial tills exposed at Flett Rapids. These are overlain by post-glacial lacustrine clay, 2.5 m of gravel and a thick sequence of deltaic sands and silts. The river banks consist of well-sorted gravels overlain by various thicknesses of silt. The older gravel deposits are overlain by the thickest silt deposits and thus form the highest banks. The youngest gravels make up point bars that are forming now. Gold is concentrated at the interface between gravel and overlying silt. Greatest concentrations are in

the youngest gravel deposits that have been reworked the greatest number of times.

### CURRENT WORK AND RESULTS

Work in 1983 consisted of reconnaissance-level sampling of Liard River sediments between Flett Rapids and Nahanni Butte and more detailed sampling in the vicinity of the claims that were staked as a result of this reconnaissance. One hundred and sixty-nine sites were sampled at about 1 km intervals on both sides of the Liard River. At 101 sites, three to four samples were collected consisting of at least one 0.33 m channel sample across a gravel/silt interface and slightly longer channel samples of the overlying silt and underlying gravel. The volume of each sample was about 10,000 $cm^3$. At 68 sites, channel banks were not developed and a 28,000 $cm^3$ sample of gravel was collected instead. All samples were panned to about 10 g of black sand and gold grains in the concentrate were counted. About half of the samples were assayed for gold. Bulk samples of about 0.76 $m^3$ were collected at 9 sites where above-average counts of gold particles had been obtained. A 20 g concentrate from this material was assayed after the sample was reduced by processing in a Pan-O-Matic sluice box, a gold pan and a cyclone. Some testing of equipment and orientation sampling was also done, as was some detailed sampling on the FLETT claims.

The number of gold grains in the 10 g channel and point-bar concentrates ranged from 0 to 600. The gold is fine and flaky (30,000 to 150,000 grains/g of gold). Some randomly selected assay results for various channel, point-bar and follow-up samples are:

| Au grains | Volume | Concentrate Weight | Assay |
|---|---|---|---|
| 400+ | 10,000 $cm^3$ | 13.4 g | 229.2 ppm |
| 200+ | 10,000 $cm^3$ | 5.8 g | 928.1 ppm |
| 43 | 10,000 $cm^3$ | 13.6 g | 25.0 ppm |
| 14 | 10,000 $cm^3$ | 17.4 g | 8.9 ppm |
| 3 | 10,000 $cm^3$ | 8.7 g | 0.1 ppm |

Work done in 1984 consisted of seismic and radar orientation surveys on FLETT 1 to establish bedrock and glacial till profiles beneath the river alluvium. The surveys were carried out on contract by A-Cubed Inc. of Mississauga, Ontario.

Three cut lines totalling about 4 km were surveyed, including a short test line on which a 3.8 m deep pit was excavated through silt to the silt/gravel interface. The radar survey succeeded in pin-pointing a discontinuity at that depth on the test line. Seismic surveys detected a reflector, probably bedrock, at depths of 60 m to 90 m. It was recommended that a fence of holes be drilled along one of the geophysical lines to test the bottom gravels.

## ROY, RON, L CLAIMS

Logan Mines Limited
305, 535 Thurlow St.
Vancouver, B.C., V6E 2L2

Lead,Zinc,Gold,Silver
95 E/12
61°37'N, 127°40'W

### REFERENCES

Gabrielse and others (1973). DIAND assessment reports: 060568, 062025, 081009, 081011, 081171, 081349, 081552, and 081929.

### LOCATION

The claims are 51 km southeast of Tungsten and 39 km northeast of the Hyland River airstrip, which is near the Canol Road in the Yukon. Access to the property is by helicopter from Tungsten or the Hyland River airstrip.

### PROPERTY

ROY 1-15 (20.9 ha), ROY 16 (83.6 ha), ROY 17 (250.8 ha), RON (606.1 ha) and L (1003.2 ha).

### HISTORY

The area was first staked as ROY 1-60 in 1968 and evaluated in 1969 by Conwest Exploration Company Limited under agreement with Cassiar Asbestos Corporation Limited. Work consisted of mapping, trenching and channel sampling on ROY 5, 6, 7, 8, 11 and 12. The rest of the group was prospected and reconnaissance silt sampling of a drainage area was done (DIAND assessment report 060568). The main showings were on ROY 7 and 11.

Massive to semi-massive sulphides consisting of galena, sphalerite and minor arsenopyrite and pyrrhotite are irregularly distributed in a 325 m long shear zone that is seldom wider than 1 m. Gold in excess of 3 g/t (maximum 8.7 g/t) was detected in 8 of 32 rocks that were assayed. Silver ranged from 26 to 980 g/t, lead from 0.6% to 46% and zinc from trace to 12%. Another 149 ROY claims were staked in 1969 to protect the core group, but no work was documented.

The area was restaked several times, most recently as ROY 1-15 by Jake Melnychuck in 1977. Some work was reportedly done in 1977 and 1978 by Amoco Canada Petroleum Company Limited, but there is no record of this in the assessment files. The claims were transferred to Logan Mines Limited in 1979. Petrological work done that year led investigators to conclude that the layered sulphides in the main zone are sedimentary-exhalative (syngenetic) in origin (DIAND assessment report 081109).

Additional work in 1979 included grid-based soil sampling and magnetometer surveys on the main showing (ROY 3) and channel sampling at 17 trenches. Seventy-five samples of immature post-Pleistocene soils were analyzed for copper, lead, zinc, silver and gold. Average results are as follows: 36 ppm Cu, 188 ppm Pb, 381 ppm Zn, 0.6 ppm Ag, and 15 ppb Au. Twenty-three channel samples, collected from trenches, assayed up to 0.03% Cu; 2% to 30% Pb; 2% to 12% Zn; 93 to 780 ppm Ag; and 0.15 to 6.0 ppm Au. The widest channel sample (3.6 m) assayed 0.01% Cu, 2.55% Pb, 2.18% Zn, 100 ppm Ag and 6.0 ppm Au. Magnetic surveying proved unsuccessful in outlining the deposit (DIAND assess-

ment report 081011). ROY 16 and 17 were added to the group in the fall of 1979.

In 1980, additional prospecting, trenching and soil sampling surveys were conducted. Horizontal loop EM surveys delimited a conductor having a signature similar to that observed over exposed massive sulphides on the property, and a position consistent with a projected extension of these main showings (DIAND assessment reports 062025 and 081171).

In 1981, twelve diamond drill holes totalling 582.5 m probed the area of the main showings. Most of the holes cut sulphide-rich rock; one of the better intersections was in DDH6-81 between 23.5 and 26.8 m: 4.7% Pb, 3.34% Zn, 133 ppm Ag, and 0.34 ppm Au (DIAND assessment report 081349).

RON was added to the ROY group in the autumn of 1981.

Detailed geological mapping and another soil survey in the vicinity of the main showings was completed in 1982 (DIAND assessment report 081552). L, to the east of RON, was staked in 1985 to protect anomalies outlined by a 1984 silt-sampling survey, which was not submitted for assessment.

### DESCRIPTION

The property is underlain by coarse clastic sediments of the Proterozoic 'grit unit' and overlying sediments of the Proterozoic 'phyllite unit' and the Lower Cambrian Sekwi Formation, which includes both clastic and carbonate deposits. The Sekwi Formation is overlain, apparently unconformably (Gabrielse and others, 1973), by carbonates of the Upper Cambrian to Lower Ordovician Rabbitkettle Formation. However, Logan Mine's geologists could find no evidence of this unconformity despite careful mapping of the contact areas. The carbonates might represent a facies equivalent of the Sekwi Formation.

The principle showings are in dark, cherty beds of the Sekwi Formation just below the contact with the Rabbitkettle Formation. They are exposed intermittently in trenches around the periphery of the north-trending ridge (Roy Ridge) that cuts across the center of the core ROY 1-15 group. On the east slope of Roy Ridge, the showings are between the 1780 m and 1900 m contours, whereas on the west slope of the ridge the showings closely parallel the 1840 m contour. Assuming continuity beneath the Rabbitkettle Formation, which caps Roy Ridge, the inferred size of the zone is 1150 m in an east-northeasterly direction. The strata are cut by several easterly trending faults and by northerly trending granitic dikes, probably derived from a Cretaceous batholith several kilometres to the south. The beds appear to be gently folded, but are affected by at least four well marked cleavages. Bedding attitudes in the Rabbitkettle Formation vary considerably, but are most commonly northeasterly trending, dipping moderately to steeply north.

Massive sulphides are in decimetre to metre-thick beds in a zone that is up to 6 m wide in the upper part of the Sekwi Formation. The massive sulphides comprise fine-to coarse-grained galena, sphalerite, pyrite and arsenopyrite. At several locales, coarse-grained galena forms distinct beds, as do layers of fine-grained sphalerite associated with fragments of black shale. Numerous soft-sediment slump features are present. Above and below the massive-sulphide units are patches and veins of lower-grade material in siliceous host rock. Sulphide and sedimentary textures suggest that the layered sulphides are syngenetic in origin, having formed probably in a sedimentary-exhalative environment similar to that of the Sullivan Mine in southeastern British Columbia. Ore minerals consist of arsenopyrite, sphalerite, pyrrhotite and galena with minor marcasite, cubanite, chalcopyrite and native gold (?).

### CURRENT WORK AND RESULTS

Work done in 1984 was not submitted as assessment, although references in the 1985 report (DIAND assessment report 081929) indicate that previously undiscovered showings were found over a wide area and that silt sampling was conducted that led to the staking of the L claim to protect anomalies.

In 1985, geological mapping, prospecting and reconnaissance soil geochemical surveying were carried out. Eighteen rock samples, 10 silt samples and 183 soil samples were collected and assayed or geochemically analyzed.

Fourteen showings and several locales of mineralized float were found. Eight of the showings are associated with an easterly trending fault that was traced from Roy Ridge east across the other four ridges covered by the claims, a distance of 7 km. Most of these showings are at contacts, either between cherty siltstone and carbonate as at the main showings on Roy Ridge, or between cherty siltstone and rusty weathering siltstone on the L claim. Eighteen samples collected from the showings assayed between 0.06 and 3.0 ppm Au (mode - 0.12 ppm), 3.1 and 427.0 ppm Ag (mode - 94 ppm), 1% to 34% Pb (mode - 5%) and 0.01% to 17% Zn (mode - 2.2%). All copper assays were less than 0.07%.

$100,000 drilling program and a $60,000 program of trenching, geological and geophysical surveys were recommended to further evaluate the property.

## PROSPECTING PERMIT 885

Gerald Ryznar
4405 Glencanyon Drive
North Vancouver, B.C.,
V7N 4B4

Zinc, Lead, Silver
95 J/13 NW
63°00'N, 123°45'N

### REFERENCES

Douglas and Norris (1961, 1977); Hawes (1980).

DIAND assessment reports: 061342, 061393, 080325, 081632, 081817.

### PROPERTY

Prospecting Permit 885 (17,728 ha).

### LOCATION

The permit is 34 km south-southeast of Wrigley and 470 km west-northwest of Yellowknife.

### HISTORY

The area was first acquired as LOU 1-20 by Cominco in the early seventies. Geological mapping and prospecting revealed numerous galena and sphalerite showings in silicified, brecciated and dolomitized zones of the Middle Devonian Nahanni Formation (DIAND assessment report 080325). NTS 95 J/13 was then acquired as Prospecting Permit 306 by Giant Yellowknife Mines Ltd. in 1974. Geological mapping and rock, soil and silt sampling surveys were done in 1974 and 1975.

Numerous showings of smithsonite, sphalerite, galena and bornite were found (DIAND assessment reports 061342 and 061393).

Permit 885 covering NTS 95 J/13 NW was issued to Gerald Ryznar in February 1982. In August of that year, Mr. Ryznar conducted a four-day examination of the property and collected two grab samples from known showings. These returned assays of 8% and 20.5% Zn, 3.9% and 10.3% Pb, and 12.1 and 23.9 ppm Ag (DIAND assessment report 081632).

### DESCRIPTION

The main structural feature on the permit is the Camsell Thrust, which is marked by a prominent scarp paralleling the eastern boundary of the property (Douglas and Norris, 1961, 1977; Hawes, 1980). The thrust exposes a north-trending, west-dipping, 1 to 2 km wide belt of Middle Devonian sediments consisting mainly of carbonates of the Nahanni Formation. These are juxtaposed against the Upper Devonian sediments to the west that occupy the remaining 90% of the permit area. All rocks have been folded about northwest-trending axis.

The principal showings are in the belt of Nahanni Formation carbonates that parallels the eastern boundary of the permit. The majority of these are in the southeast corner of the permit, where the Nahanni Formation appears to have been thickened by a northwest-trending synclinal fold that bisects the property. Some of the showings are vein-like and carry as much as 38% combined Pb-Zn and 90 ppm Ag. Others appear to be mineralized breccias, while yet others consist of stratiform disseminated lead and zinc-bearing minerals. The strike length of most zones has not been established, although widths range up to 4.5 m. Mr. Ryznar suggested that the source of the base metals is the shale basin immediately west of the carbonate belt.

### CURRENT WORK AND RESULTS

Because much of the area of interest on the permit is covered with overburden and vegetation, particularly black spruce, a biogeochemical survey of black spruce bark samples was undertaken in 1984 in an effort to indicate target areas for future work. The sampling was carried out by crews from Taiga Consultants of Calgary, Alberta.

Bark samples from black spruce trees were collected at 100 m intervals along lines set 100 m apart. At least 200 g of bark was collected at each station in the field. The sampling was done in the southeast corner of the permit, in an area known for its numerous showings, and in an area in which the overburden cover inhibits normal prospecting.

Results indicate at least three areas on the grid where there are coincident biogeochemical silver, zinc and lead anomalies. Analyses range to 0.137 ppm Ag, 179.0 ppm Zn and 0.83 ppm Pb. Follow-up geochemical soil sampling, geophysical surveys and surface trenching are recommended.

Permit 885 lapsed at the end of 1984 and RR1 was staked to protect areas of interest (DIAND assessment report 081817).

## NAHANNI CLAIM

Canada Tungsten Mining Corp. Ltd.
P.O. Box 9, Tungsten, NWT, X0H 0A0

Tungsten, copper
105 H/16
61°51'N, 128°03'W

### REFERENCES

Blusson (1968, 1966).
DIAND assessment reports: 081386, 081770.

### PROPERTY

NAHANNI (899 ha).

### LOCATION

The property is in the Ragged Ranges of the Selwyn Mountains, 16 km southeast of Tungsten.

### HISTORY

The claim was staked in July, 1979, to cover a tungsten-copper showing in a stratigraphic package similar to that at the Cantung Mine (Blusson, 1968). In 1981, several showings were sampled and the property was mapped at a scale of 1:7200 (DIAND assessment report 081836).

### DESCRIPTION

Blusson (1966) conducted detailed mapping in the Cantung area and described the stratigraphy (Table 3-1).

This same stratigraphic sequence is present on the Nahanni claim except that Unit 6 is missing. Most of the claim is underlain by Units 9 and 5, but Units 1 to 3 crop out in the center of the property along the crest of a northwest-trending anticline, and outcrops of Unit 11 are present in the southeast corner of the claim.

The main showing is in Unit 2 at the crest of the anticline near the center of the property. At this locale, the anticline is isoclinal, apparently overturned, and plunges gently to the southeast (?). The showing comprises light-green, banded

*TABLE 3-1: STRATIGRAPHY OF THE CANTUNG AREA*

| | |
|---|---|
| UNIT 11: | Cretaceous quartz monzo-granodiorite intrusions. |
| UNIT 9: | Middle and Upper (?) Cambrian silty grey limestone of the Rabbitkettle Formation. |
| UNIT 6: | Lower and Middle Cambrian sandy and sparry dolomite of the Sekwi Formation. |
| UNIT 5: | Lower Cambrian grey crystalline limestone and marble; Blusson's "Ore Limestone" unit and host to the underground orebody at Cantung. |
| UNIT 3: | Lower Cambrian grey crystalline limestone and marble; Blusson's "Ore Limestone" unit and host to the underground orebody at Cantung. |
| UNIT 2: | Lower Cambrian interbedded cherty argillite, siltstone and limestone; Blusson's "Swiss Cheese Limestone" unit and host to the open- pit orebody at Cantung that has now been mined out. |
| UNIT 1: | Lower Cambrian and earlier (?) slate, siltstone and fine-grained quartzite; Blusson's "Lower Argillite" unit. |

skarn containing disseminated scheelite and chalcopyrite and fracture fillings of quartz and chalcopyrite. Two chip samples of skarn from one locale assayed 0.42% $WO_3$ across 1.8 m and 0.34% $WO_3$ across 1.6 m. Another pair of chip samples collected from skarn 60 m to the west assayed 0.47% $WO_3$ across 1.5 m and 0.35% $WO_3$ across 1.5 m. A grab sample assayed 0.82% $WO_3$ and 0.92% Cu.

Another type of showing on the property consists of tungsten and copper-bearing skarn and massive sulphide lodes in Unit 5 adjacent to the biotite-quartz monzonite stock near the southeast corner of the claim. The massive sulphide lodes are in an easterly striking, steeply northeast-dipping quartz vein that is up to 5.5 m wide and has been traced for at least 300 m. The vein is deeply weathered and forms a manganiferous gossan. The lodes consist of massive pyrrhotite and minor chalcopyrite, scheelite and pyrite. One series of chip samples across a massive sulphide lode returned 0.49% $WO_3$ across 5.5 m. In the same general area, several chip and grab samples were collected from outcrops of tungsten and copper-bearing diopside and garnet skarns. The best assay obtained was 0.50% $WO_3$ and 2.0% Cu across 4 m.

In addition, four other types of showings were found on the property. These are:

1) Tungsten and copper-bearing skarn in Unit 5 near the main showing;
2) Tungsten and copper-bearing skarn associated with dikes throughout the property;
3) Tungsten, copper and molybdenum-bearing quartz stockworks in portions of the biotite-quartz-monzonite stock;
4) Auriferous (?) quartz-arsenopyrite-pyrite-scorodite veins that crosscut the stock and altered country rocks.

### CURRENT WORK AND RESULTS

In 1984, the main showing was trenched and sampled. Seven trenches (0.6 m deep, 1.2 m wide and 6.1 to 24.4 m long) were excavated and 1.5 m long chip samples were collected for assay. An eighth trench was excavated but not sampled. Assays of 43 chip samples are as follows:

$WO_3$: the best assay was 0.56%; three assays range from 0.16% to 0.18%; the remaining 39 assays range from 0.01% to 0.06%

Cu: two assay of better than 1% (1.52% and 2.78%) correspond with high $WO_3$ assays; 41 assays range from 0.01% to 0.88%

Zn: the best assay, 2.78%, corresponds with the high Cu and $WO_3$ assays; 42 assays are less than 0.42%.

## MONA AND JAY CLAIMS

Goldex Resource Incorporated
402, 1755 W. Broadway
Vancouver, B.C., V6J 4S5

Gold, Silver, Lead, Zinc
105 I/1
62°06'N, 128°13'W

### REFERENCES

Gordey (1980, 1981).

DIAND assessment reports: 060589, 080311, 081535, 081659 and 081918.

### PROPERTY

JAY 1-2 (167.2 ha), MONA 1-3 (167.2 ha).

### LOCATION

The claims are in the valley of Zenchuck Creek, 15 km north of Tungsten. Access is by helicopter, which is often available at Tungsten. The road to Tungsten passes within 10 km of the property.

### HISTORY

Regional geological, geophysical and geochemical surveys were done by Canada Tungsten Mining Corporation on Prospecting Permit 26 in 1961, but only one small scheelite-bearing skarn was found and the permit was allowed to lapse (DIAND assessment report 060589).

JAY 1-12, RIO 13-24 and LEO 1-12 were staked by Alex Black in 1973 and examined that year by Gavin Dirom for the TCL Exploration Group. Samples collected from showings were assayed for gold and other elements. Best assays were 1.55 ppm Au, 51.6 ppm Ag, 2.03% Pb, 2.2% Zn and 18.8% As (DIAND assessment report 080311).

Alex Black excavated 2 trenches on JAY 5 in 1981 and sampled these trenches and several other showings. Best assays from 12 samples were 5.3 ppm Au, 212 ppm Ag, 14.3% Pb, 3% Zn and 0.069% $WO_3$ (DIAND assessment report 081535).

All of the original JAY claims as well as the LEO and RIO claims were allowed to lapse.

MONA 1 was recorded by Alex Black in July of 1981. A 9 m pit was excavated near the southeast corner of the claim in 1983 and eight samples were collected and assayed for gold and silver. Assays ranged from 0.093 ppm to 7.8 ppm Au and 0.31 ppm to 80.9 ppm Ag (DIAND assessment report 081659).

JAY 1 and 2 were staked by Alex Black in 1983 and transferred, along with MONA 1, to Goldex Resource Incorporated that year. MONA 2 and 3 were staked for Goldex in 1984.

### DESCRIPTION

The claims cover the valley of Zenchuck Creek, a northwest-trending tributary of Flat River, at elevations ranging from 1340 m to 1525 m. To the southwest of Zenchuck Creek, where all of the 1984 work was done, the property is underlain mainly by Helikian to Lower Cambrian phyllites of the Backbone Ranges Formation. To the northeast of the creek, the claims are underlain by Lower Cambrian quartzite and siltstone as well as a 150 m wide band of carbonate that has been converted to marble in proximity to a Cretaceous quartz-monzonite stock that outcrops northeast of the property.

The phyllites of the Backbone Ranges Formation are mainly northwest trending and steeply northeast dipping. Foliation generally dips steeper than bedding, but is rarely vertical. Variations in dip directions suggest that the various showings may be on the axis of a shallowly southeast-plunging anticline.

The showings consist of swarms of veins ranging in width from 5 to 100 cm, averaging 15 cm. The veins strike 130° to 140° and dip vertically or steeply northeast. Most veins parallel schistosity in the enclosing phyllites, but in several locales cross-veinlets intersect the foliation-parallel veinlets. Locally, quartz veining is so prevalent that they can be deemed stockwork deposits.

The veins consist of quartz, minor calcite, and variable amounts of arsenopyrite, pyrite, sphalerite, galena and chalcopyrite (in order of abundance). Tourmaline and stibnite were occasionally observed. The larger veins appear to follow faults or fractures subparallel to foliation. The phyllite adjacent to sulphide-rich veins is lightly hornfelsed and occasionally chloritized.

### CURRENT WORK AND RESULTS

A grid was established, mainly on MONA 1 and 3, with a 450 m long northwest-oriented baseline and 600 m long wing lines at 150 m intervals. Soil and rock sampling, VLF-EM and magnetometer surveys were conducted on the grid.

The soil sampling survey detected arsenic anomalies ranging to 4000 ppm, lead to 455 ppm, silver to 1.3 ppm and gold to 140 ppb. Only five samples had greater than 10 ppb Au. The tenor of arsenic in the soils is particularly high, with most samples returning more than 100 ppm As. Arsenic, lead and silver anomalies show moderately good correlation, and several zones warranting further evaluation were identified.

Thirteen of 36 rock samples (grab and chip) collected on the grid assayed better than 0.31 ppm Au to a maximum of 8.5 ppm Au. However, the best assay from veins exposed in pits along the baseline was 1.06 ppm Au across 1 m.

The magnetometer survey did not yield useful information, but VLF-EM conductors were found over mineralized veins using the Hawaii and Seattle transmitting stations.

Additional claim staking, gridding, soil sampling, trenching, geological mapping, VLF-EM surveying and diamond drilling were recommended (DIAND assessment report 081918).

## BOARD, SURF CLAIMS

Placer Development Ltd.
Box 49330,
Bentall Postal Station
Vancouver, B.C., V7X 1P1

Tungsten
105 I/7
62°20'N,128°55'W

### REFERENCES

Goodfellow (1982); Gordey (1980, 1981).
DIAND assessment reports: 080356, 080400, 080556, 081803.

### PROPERTY

BOARD (669 ha) and SURF (334 ha).

### LOCATION

The claims are 65 km north-northwest of Tungsten.

### HISTORY

The area of the claims was staked as the ALPHA, BRAVO, ECHO and CHAR claims by Mr. Cliff Turner in 1973. Between 1973 and 1976, several companies worked the property, undertaking geological, geophysical and geochemical surveys. Several diamond and percussion holes were drilled to test a silver-lead-zinc showing (Fern Showing). The claims lapsed in the late seventies (DIAND assessment reports 080356, 080400, 080556)

On August 2, 1982, the Geological Survey of Canada (GSC) released the results of a geochemical silt sampling program covering the Nahanni map-area (Goodfellow, 1982). SURF was staked in November of that year to cover tungsten anomalies detected in the GSC survey. BOARD was added to the north and east of SURF in 1984.

### DESCRIPTION

The claims are underlain by siltstone, fine-grained quartz arenite and slate of the Proterozoic Backbone Range Unit (Gordey, 1981). Carbonates of the Upper Cambrian Rabbitkettle Formation lie to the south and west of the claims and host the Fern Pb-Zn-Ag skarn showing. No intrusion has been mapped or identified in the area, although the presence of the Fern skarn suggests that there may be one at depth.

### CURRENT WORK AND RESULTS

The following types of samples were collected on and around the property in 1982, 1983 and 1984:

1) stream sediment samples: seven in 1982, nine in 1983, eight in 1984.
2) creek-bank soil samples: 30 in 1984.
3) heavy mineral samples: one in 1982, five in 1983. Approximately 7 to 8 kg of sieved material (-20 mesh) was obtained from stream sediments. Two fractions were separated and analyzed; the coarse (-35 to +150 mesh), heavy (S.G. greater than 3.0), non-magnetic fraction (CHN) and the fine (-150 mesh), heavy, non-magnetic fraction (FHN).
4) bulk samples: four in 1983, five in 1984. Approximately 2 to 3 kg of sieved material (-20 mesh) was obtained from stream sediments.

Samples collected in 1982 and 1983 were analyzed for copper, zinc, tungsten, arsenic, tin and antimony, the heavy mineral factions were also analyzed for lead, silver and gold. In 1984, all samples were analyzed for copper, lead, zinc, silver, tungsten, gold and tin.

**Tungsten:** Tungsten anomalies were found in all the sampled media, including: greater than 500 ppm in sediment; 5.7% in the CHN faction; 3.9% in the FHN faction; and 105 ppm in bank soil. Analytical results from bulk samples were generally lower than those from conventional stream sediments.

**Gold:** Gold contents of bulk, stream sediment and bank soil samples were below the detection limit (0.02 ppm). The highest gold analyses were from the CHN factions (0.04 ppm Au and 7.20 ppm Au) and FHN factions (1.77 ppm Au and 2.90 ppm Au) of the two heavy mineral samples in which the highest tungsten concentrations were found.

**Tin:** Up to 13 ppm Sn was obtained in stream sediments, greater than 500 ppm Sn in three heavy-mineral samples, and up to 18 ppm Sn in bank-soil samples.

**Silver:** Silver analyses from all sample media were either below the detection limit (0.2 ppm) or non-anomalous (maximum 1.3 ppm).

**Copper, lead, zinc:** Copper content ranged from 16 to 138 ppm, lead from 10 to 230 pm, and zinc from 57 to 217 ppm in stream sediments, bulk and soil-bank samples. The best lead-zinc anomalies were from streams draining the Fern showing.

**Arsenic-antimony:** Arsenic content of stream sediment and bulk samples was at or below the detection limit (2 ppm). The

highest arsenic anomaly was 280 ppm in the CHN faction of a heavy mineral sample. All antimony determinations were less than or equal to 3.3 ppm (DIAND assessment report 081803).

## QUICK AND EASY CLAIMS

Hudson Bay Exploration & Development Co. Ltd.
P.O. Toronto-Dominion Centre
Toronto, Ont., M5K 1B8

Tungsten
105 I/11
62°39'N, 129°16'W

### REFERENCES

Goodfellow (1982); Gordey (1981).
DIAND assessment reports: 080323, 081780.

### PROPERTY

QUICK (418 ha) and EASY (263 ha).

### LOCATION

The claims are 90 km north-northeast of Tungsten. They are adjoined and partly enveloped by Canamax's NUG claims (Fig. 3-2).

### HISTORY

On August 13, 1982, the Geological Survey of Canada (GSC) released the results of a geochemical silt sampling program covering the Nahanni map-area (Goodfellow, 1982). QUICK was staked that same day to cover a 60 ppm tungsten anomaly detected in the GSC survey. EASY was added on the north side of QUICK the following year. The claims cover part of an area that was staked in the early seventies by Cowal Resources Ltd. and explored for lead and zinc (ROD claims, DIAND assessment report 080323).

### DESCRIPTION

The area is underlain by Upper Devonian to Mississippian pelitic sediments comprising chert-pebble conglomerate, chert-quartz arenite and wacke, and minor black shale, siltstone and slate (Gordey, 1981).

### CURRENT WORK AND RESULTS

In 1983, several locales upstream from the tungsten anomaly were panned. Scheelite grains in the heavy-mineral concentrate were counted and classified according to grain size.

In 1984, a twenty person-day program of panning, soil sampling and magnetometer surveying was conducted. A crude (topofil and flagging) grid was established to control the surveys. Forty-one samples were collected at 100 m intervals along six north-trending winglines separated by 100 m (winglines on either side of the creek from which the tungsten anomaly was obtained; baseline along the EASY-QUICK claim boundary). Results of the analyses are: Trace to 1.4 ppm Ag, 4 to 42 ppm Cu and 2 to 38 ppm W. There is a moderate correspondence between tungsten and copper anomalies on the east side of the creek, where a broadly anomalous zone appears to be open to the south. The magnetometer survey outlined an east-northeast trending magnetic low that is unrelated to the pattern of the copper-tungsten anomaly in soils (DIAND assessment report 081780).

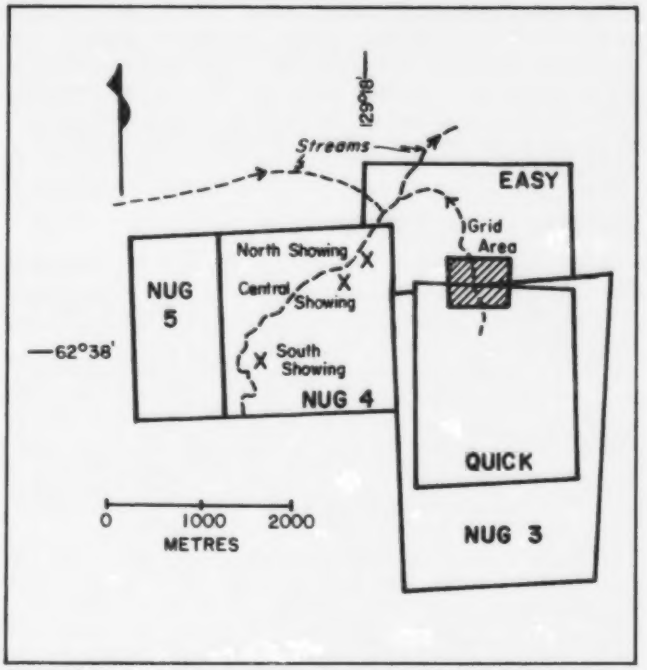


*FIGURE 3-2: Property map outlining grid area on the QUICK-EASY claims and showings on the NUG 4 claim.*

## NUG CLAIMS

Canamax Resources Inc.
601-535 Thurlow St.
Vancouver, B.C., V6E 3L6

Tungsten
105 I/11
62°37'N, 129°15'W

### REFERENCES

Goodfellow (1982); Gordey (1981).
DIAND assessment reports: 081781, 080323.

### PROPERTY

NUG 3-5 (947 ha).

### LOCATION

The claims are 90 km north-northeast of Tungsten. They adjoin and partly envelope Hudson Bay Exploration and Development's QUICK and EASY claims (Fig. 3-2).

### HISTORY

On August 3, 1982, the Geological Survey of Canada (GSC) released the results of a geochemical silt sampling program covering the Nahanni map-area (Goodfellow, 1982). NUG 3 was staked that same day to cover a 60 ppm tungsten anomaly detected in the GSC survey. NUG 4 was added to the property in July, 1983 and NUG 5 in June, 1984. The NUG claims cover part of an area that was previously staked in the early seventies by Cowal Resources Ltd. and explored for lead and zinc (ROD claims, DIAND assessment report 080323).

## DESCRIPTION

The area is underlain by Upper Devonian to Mississippian pelitic sediments comprising chert-pebble conglomerate, chert-quartz arenite and wacke, and minor black shale, siltstone and slate (Gordey, 1981).

## CURRENT WORK AND RESULTS

In 1982, a number of talus fines were collected and analyzed for tin and tungsten.

Work in 1983 consisted of geological mapping and prospecting for scheelite and wolframite. Three tungsten showings were found in outcrops along a northeast-flowing stream on NUG 4.

The South showing comprises several weakly hornfelsed outcrops cut by up to eight 1 to 25 cm wide coarsely crystalline quartz-sericite veins across a 10 m interval. The veins strike parallel to bedding (115° to 120°), dip vertically, and contain traces of pyrite and scheelite.

The Middle showing comprises coarse scheelite and wolframite in 2 to 30 cm wide quartz veins as well as disseminated scheelite and pyrrhotite in intervening sandy beds. The veins, most of which trend 125°, consist of coarse crystalline quartz and medial clots of late-stage pyrite, arsenopyrite, bismuth and bismuthinite. Scheelite crystals, which are often coarse (3 cm) and idiomorphic, locally constitute 10% to 50% of vein material. The sandy beds vary in width from 0.1 to 1.5 m and, where mineralized with fine to medium-grained scheelite, are uniformly mineralized across the width of the bed.

The North showing consists of six parallel, vuggy quartz veins in phyllite. The veins can be traced along strike for 30 m and are 1 to 10 cm wide. They host medial concentrations of carbonate and pyrrhotite as well as sparse disseminations of scheelite, wolframite and chalcopyrite. The country rocks in the vicinity of all three showings are marked by an alteration zone where the originally dark-grey to black sediments have been bleached a light grey to tan colour.

The 1984 work program consisted of detailed grid soil sampling, prospecting and geological mapping over a 9 km² area covering previously identified alteration zones on NUG 4. Approximately 910 soil and talus-fines samples were collected and analyzed for tungsten and zinc. Every fourth sample was analyzed for tin. Tungsten analyses ranged from 1 ppm to more than 2000 ppm, zinc from 6 to 500 ppm, and tin from 1 to 178 ppm. Soils collected in the vicinity of scheelite-bearing wacke beds and quartz veins had a low geochemical response (maximum 50 ppm W).

# GRUMP CLAIM

Giant Yellowkife Mines Ltd.
Box 3000,
Yellowknife, NWT, X1A 2M2

Gold, Silver, Lead, Zinc, Arsenic
105 I/15
62°57'N, 128°43'W

## REFERENCES

Grenn and others (1968); Gordey (1980).
DIAND assessment reports: 081108, 081914.

## PROPERTY

GRUMP (523 ha).

## LOCATION

The claim is 750 km west of Yellowknife and 75 km east-southeast of MacMillan Pass. Access is by helicopter, although float planes can land on O'Grady Lake 20 km west-northwest of the claim. The nearest reach of the Canol Road is 65 km to the northwest. The claim ranges in elevation from 1280 m to 1980 m.

## HISTORY

The property was staked as MASS by Welcome North Mines Limited in 1979 and was optioned to Riocanex Incorporated after grab samples of massive sulphide float returned assays of up to 11.4% Pb, 128.2 g/t Ag and 22.8 g/t Au. Vertical loop, VLF-EM, soil sampling, trenching and prospecting surveys in 1980 failed to detect the source of the massive sulphide float. The trench did not reach bedrock and the soil sampling survey was ineffective because of poor soil development. Geophysical surveys outlined a conductive zone beneath the sulphide-rich float, but this was attributed to disseminated pyrite and pyrrhotite (DIAND assessment report 081108). MASS lapsed in 1983, was restaked as GRUMP in June of that year, and was transferred to Giant Yellowknife Mines Limited the following year.

## DESCRIPTION

The regional geology of the Nahanni map area is shown by Green and others (1968) and Gordy (1980, 1981). On GRUMP, detailed geology is documented only in a 0.64 km² zone covered by a grid in the southeast corner of the claim block. The northern two-thirds of the grid is underlain by grey-weathering, well-layered dolomite and limestone; possibly lower Paleozoic sediments of the Road River Formation (DIAND assessment report 081108). The southern third of the grid is underlain by monzonite that forms a peripheral phase of the Cretaceous O'Grady Batholith (to the south). A 50 m wide zone of hornfelsed, skarnified and rusty-weathering rocks is present at the irregular contact between the two lithologies. Within this zone are carbonates containing disseminated pyrrhotite (up to 5%) and minor chalcopyrite and sphalerite. Also, there are numerous small boulders of massive arsenopyrite galena - pyrite - chalcopyrite - sphalerite, probably derived from the trench excavated by Riocanex.

## CURRENT WORK AND RESULTS

Geological and geophysical surveys were conducted on a 320 m long by 200 m wide grid with wing lines at 40 m intervals and pickets emplaced every 20 m. The baseline azimuth is 070° and its origin is centered on the Riocanex trench.

The geophysical surveys outlined coincident total-field magnetometer, vertical-gradient magnetometer and VLF-EM anomalies over the baseline. Three diamond drill holes were recommended to probe this anomaly, which is considered to be caused by massive or semi-massive sulphides.

Three grab samples of pyrrhotite-rich carbonates were assayed for copper, zinc, gold, silver, lead and arsenic. These contained trace to nil concentrations of all metals except for

one sample which assayed 0.51 g/t Au. Six grab samples of massive sulphide float were collected near the trench. Assays were between 8.23 to 29.49 g/t Au (average 18.6), 7.54 to 147.43 g/t Ag (average 61.4), and 16 to 37% As (average 29%). Three interesting lead assays were obtained (6% to 14%), but all zinc and copper assays were less than 1% (DIAND assessment report 081914).

## GRAYLING AND CANOL CLAIMS

Amax Northwest Mining
Co. Ltd.
P.O. Box 12525, Oceanic Plaza
1066 W. Hastings St.
Vancouver, B.C., V6E 3X1

Tungsten
105 O/8
63°16'N, 130°02'W

### REFERENCES

Blusson (1974).
DIAND assessment reports: 081622, 081892.

### PROPERTY

GRAYLING (314 ha) and CANOL (251 ha).

### LOCATION

The claims are on MacMillan Pass adjacent to the Yukon border and are about 170 km north-northwest of Tungsten. They cover the access route across MacMillan Pass to the Mactung Mine.

### HISTORY

The claims were recorded in 1981. Work done in 1981 and 1982 included road construction, aerial photography surveys and engineering surveys (DIAND assessment report 081622).

### DESCRIPTION

The claims are mainly underlain by undivided, fine-grained Paleozoic clastic sediments that have been folded about east-trending axes (Blusson, 1974).

### CURRENT WORK AND RESULTS

Work in 1984 comprised road construction to eliminate switchbacks, improve the entrance from North Canol Road and upgrade the alignment and grade on the mine access road (DIAND assessment report 081892).

## COAL LICENCE 156

Petro-Canada Resources Coal
Coal Division, Box 2844
Calgary, Alta., T2P 3E3

117 A/9E
68°41'N, 136°15'W

### REFERENCES

Norris (1981).
DIAND assessment report: 062161.

### PROPERTY

Coal Licence 156 (25,628 ha).

### LOCATION

The property is on the western edge of the Mackenzie Delta, about 110 km northwest of Inuvik. The western boundary of the property is the Yukon border.

### HISTORY

The coal licence was acquired by Petro-Canada in 1981. Between 1940 and 1956 coal was mined from a vertical seam that outcrops near Coal Mine Lake in the northwestern portion of the property. This coal was used for domestic fuel in Aklavik.

### DESCRIPTION

COAL LICENCE 156 is included in an area that was mapped at a 1:250,000 scale by Norris (1981). The sediments on the property are part of a series of Cenozoic mollassic wedges that were deposited in the Richards Island Basin. Coal seams are confined mainly to the lower member (Aklak Member) of the early Tertiary Reindeer Formation, which comprises interbedded conglomerate, sandstone, siltstone, claystone and coal deposited in a stream-dominated delta-plain complex. Twenty-one coal seams ranging in thickness from 0.4 m to 4.4 m have been identified within a stratigraphic thickness of 300 m. The aggregate thickness of coal in this stratigraphic section is at least 27 m.

### CURRENT WORK AND RESULTS

Work in 1982 comprised plane-table surveying, detailed geological mapping (1:5000) and trenching to establish a preliminary interpretation of the structure, coal quality and resource potential of the Aklak Member on the property. Twenty-one trenches were excavated to expose and sample the coal seams. The exploration demonstrated a low strip-ratio resource potential of more than 500 Mt of high-volatile bituminous B to sub-bituminous A thermal coal.

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# CHAPTER 4
# ARCTIC ISLANDS REGION

**Walter A. Gibbins**
**District Geologist Arctic Islands**

## INTRODUCTION

The Arctic Islands Region corresponds to the District of Franklin; it includes the Arctic Islands and Melville Peninsula.

The Arctic Archipelago includes all or parts of several major geological provinces. To the south and east it is bound and in part underlain by Precambrian rocks of the Canadian Shield as exposed in the Minto Arch, the Boothia Uplift, and on Melville Peninsula, eastern Devon Island, Ellesmere Island, and most of Baffin Island (Fig. 4-1).

The north-trending Cornwallis Fold Belt, which divides the Arctic Platform and Franklin Geosyncline into eastern and western parts, developed mainly in Silurian and Devonian time in response to periodic faulting caused by movements of the Boothia Uplift. The Sverdrup Basin, which in late Proterozoic and Mesozoic time was superimposed on the folded Franklin Geosyncline, was itself folded in Cenozoic time. Relatively undisturbed Proterozoic sediments occur in several parts of the Arctic Islands, notably Northern Baffin, Victoria, Somerset and Ellesmere Islands. Comprehensive reviews of the evolution of the Canadian Arctic Islands are given by Thorsteinsson and Tozer (1970) and by Kerr (1981). A volume entitled Geology of the Innuitian Province is being prepared for the Geology Society of America's Decade in North America Geology project and is scheduled to be published in 1987. Summaries of the mineral resources of the Arctic Islands have been prepared by the Geological Survey of Canada (1980a) and by Gibbins (1982 and in press).

The region's two operating mines, Cominco Ltd.'s Polaris mine on Little Cornwallis Island and Nanisivik Mines Ltd.'s mine at Strathcona Sound, northwest Baffin Island, are the two most northerly metal mines in the world. The 1984-1985 production from the two mines is estimated at 90,000 t of lead concentrate and 585,000 t of zinc concentrate. Zinc concentrate from the Nanisivik mine also contains considerable silver by-product (see Chapter 2).

During 1984 and 1985, mineral exploration in the Arctic Islands continued at a relatively high level of activity and expenditure of funds. Some activity took place in all parts of the region (Fig. 4-1). The most notable drop was in coal exploration, which was discontinued in 1984-85 after strong interest in 1980-83 (Gibbins, 1984 and 1985). Major projects that included diamond drilling were: exploration for copper-silver deposits in Natkusiak Formation basalts in the Shaler Mountains of Victoria Island by Panarctic Oils Ltd. (1 in Fig. 4-1); exploration for additional zinc-lead resources in the vicinity of the Polaris Mine, Little Cornwallis Island by Cominco Ltd. (3 in Fig. 4-1); and base metal exploration in the Strathcona Sound area, northwestern Baffin Island, by both Nanisivik Mines Ltd. and Petro-Canada Ltd. (5 in Figure 4-1). During the 1984-85 period, Borealis Exploration Ltd. shifted the direction of exploration on its prospecting permits on Melville Peninsula (6 in Fig. 4-1) from iron to gold.

Smaller exploration projects in 1984 included copper-silver exploration near Hadley Bay, Victoria Island (2 in Fig. 4-1).

In the Cornwallis Lead-Zinc District, Cominco Ltd. conducted an IP survey on Kalivik Island (15 km north-northwest of Polaris), and Tanqueray Resources Ltd. prospected and sampled lead-zinc showings on Baillie Hamilton Island (4 in Fig. 4-1). Nanisivik Mines Ltd. spent one day in 1984 examining showings in a greenstone belt in the Icebound Lake - Mary River area (Jackson, 1978). Petro-Canada Ltd. collected and analysed a few heavy mineral samples from southwestern Ellesmere Island in 1984 and carried out a reconnaissance geochemistry survey in the vicinity of Dewar Lake, west-central Baffin Island (7 in Fig. 4-1).

DIAND's Arctic Island District Geologist continued examinations and studies of areas with potential and known carvingstone resources as part of the Department's on-going responsibilities. The 1984 work included visits to two areas on the Arctic coast near the mouth of Bathurst Inlet. Near Inman Harbor (8 in Fig. 4-1), a large inclusion of soapstone in granite was examined. Near Hope Bay (9 in Fig. 4-1), highly serpentinized peridotites were examined. These peridotites were recognized as the first rocks of komatiitic composition to be reported in the Slave Province (Gibbins and Hogarth, 1986). In the eastern Arctic, a brief reconnaissance was made of mafic and ultramafic meta-igneous rocks near Longstaff Bluff, Baffin Island. In 1985, two well established sources of carvingstone for southern Baffin Island were visited: a serpentine marble site at Aberdeen Bay-Markham Bay (10 in Fig. 4-1) and a serpentinized peridotite-amphibolite at McKellar Bay (11 in Fig. 4-1). The Government of the Northwest Territories Department of Economic Development sponsored the initial use of a non-explosive demolition agent to the Clearwater Fiord carvingstone site (12 in Fig. 4-1).

In August 1985, Dr. Walter Gibbins, Arctic Island District Geologist and Dr. Don Hogarth, Professor of Mineralogy, University of Ottawa visited a mica quarry in pegmatite at Niante Harbor on Cumberland Sound (13 in Fig. 4-1). It has been reported that 14.5 t or $120,000 worth of mica was recovered from this site in 1876 (Milward, 1930 and Blackadar, 1967).

Dr. Laurie Curtis developed a genetic model for the Nanisivik ore deposit, described in a 1984 internal company report. Current research projects concerning the geology and origin of the Nanisivik ore deposits are listed in Table 4-1.

The mineral rights of a large portion of northeastern Ellesmere Island (almost 40,000 km$^2$) were removed in June 1982, by Privy Council order number 1982-1875 as Ellesmere Island National Park Reserve. This includes parts of NTS areas 120 C-F and 340 D, E and H. An assessment of the mineral and hydrocarbon resource potential of this area was recently published by the Geological Survey of Canada (1981a).

In June 1984, representatives of the Government of Canada and the Committee for Original Peoples' Entitlement (COPE),

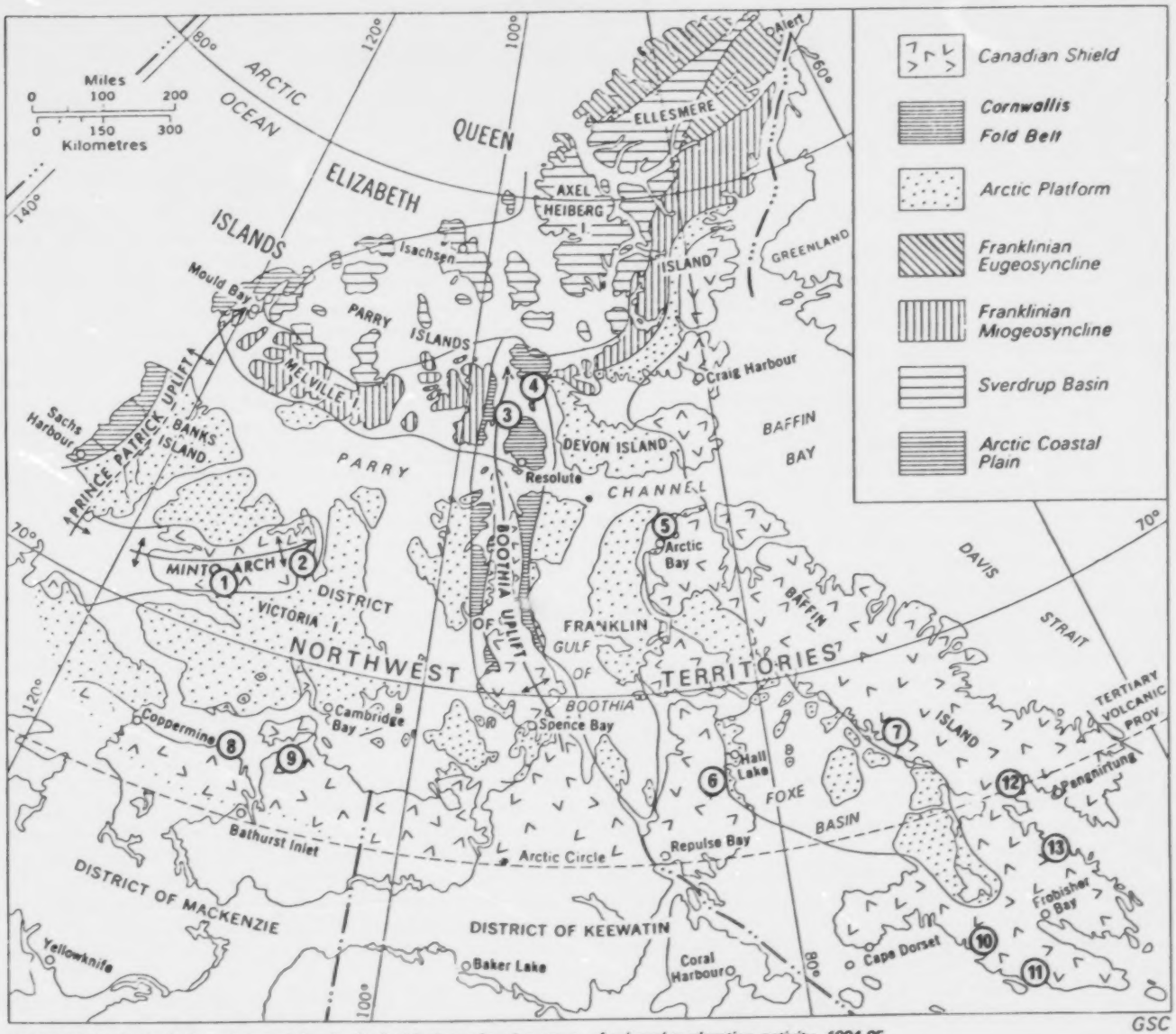



*FIGURE 4-1: Geological provinces of the Arctic Archipelago showing areas of mineral exploration activity, 1984-85.*

***TABLE 4-1: GEOLOGICAL RESEARCH PROJECTS CURRENTLY UNDERWAY ON THE NANISIVIK ORE DEPOSIT***

1. F. Ghazban: Stable Isotopes of the Ore and Host Rocks — to study the conditions of ore formation and the possible derivation of ore-forming fluids — Ph.D., McMaster University.
2. D. Arne: Temperature Variations Between and Within Ore units — to study physical conditions occurring during ore formation — M Sc: Lakehead University.
3. M. Neumann: Geochemistry of the Nanisivik Ore Bodies — to study ore genesis and possible sources. Ph.D.; Heidelberg.

representing the Inuvialuit of the western Canadian Arctic, signed final agreement for land rights settlement. Under this agreement, 13,000 km² (5,000 sq.mi.) of lands, including surface and sub-surface rights were granted to COPE. These are known as 7(1a) lands and are mainly around existing Inuvialuit communities. The surface rights to another 78,000 km² (30,000 sq.mi.) of land, excluding subsurface rights, were also granted to COPE. The subsurface rights for these lands, known as 7(1b) lands, fall under the Canada Mining Regulations, the Canada Oil and Gas Act, etc. However, access to these lands requires that prior notice be given to the Inuvialuit. These 7(1b) lands are mainly in coastal areas of southern Banks Island, western Victoria Island and the adjacent mainland between the Crocker River and the Alaska border (INAC, 1984).

**KEY TO FIGURE 4-1**

| ID | AREA | GEOLOGICAL TARGET | COMMODITY | ORGANIZATION |
|---|---|---|---|---|
| 1. | Northwest Victoria Island | Proterozoic sediments and volcanics of Shaler Group | Copper, silver | Panarctic Oils Ltd. |
| 2. | Hadley Bay, Victoria Island | Proterozoic sediments | Cobalt, copper | Bill Reid |
| 3. | Polaris Mine, Little Cornwallis Island | MVT deposits in Thumb Mountain Fm. dolomite | Zinc, lead | Cominco Ltd. |
| 3. | Kalivik Island | MVT deposits in Thumb Mountain Fm. dolomite | Zinc, lead | Cominco Ltd. |
| 4. | Baillie Hamilton Island | MVT deposits in Thumb Mountain Fm. dolomite | Zinc, lead | Tanqueray Resources Ltd. |
| 5. | Nanisivik Mine, NW Baffin Island | MVT deposit in Society Cliffs Fm. dolomite | Zinc, lead | Nanisivik Mines Ltd. |
| 5. | Elwin Inlet NW Baffin Island | Fault controlled veins in Proterozoic sediments | Silver, barite | Petro-Canada Ltd. |
| 6. | Melville Peninsula | Iron formation | Gold, iron, Zinc, nickel | Borealis Exploration Ltd. |
| 7. | Dewar Lakes | Gold in Pilling Group | Precious metals | Petro-Canada Ltd. |
| 7. | Longstaff Bluff | Meta-mafic and utramafics | Carvingstone | Geology Division DIAND |
| 8. | Inman Harbor | Mafic xenoliths in granite | Carvingstone | Geology Division DIAND |
| 9. | Hope Bay | Serpentinized Peridotite | Carvingstone | Geology Division DIAND |
| 10. | Aberdeen Bay | Serpentinized marble | Carvingstone | Geology Division DIAND |
| 11. | McKellar Bay | Serpentinized peridotite | Carvingstone | Geology Division DIAND |
| 12. | Clearwater Fiord | Altered granite | Carvingstone | GNWT Economic Development |
| 13. | Niante Harbor | Pegmatite | Mica | Geology Division DIAND |

Scheduled jet service is available to Resolute Bay, Cambridge Bay, Nanisivik, Frobisher Bay and Hall Beach. Most Arctic settlements have scheduled Twin Otter flights at least once a week. Camp moves and resupply flights for exploration crews are usually by chartered Twin Otters equipped with oversize tires for landing directly on the Arctic tundra. These aircraft are available in Resolute Bay, Frobisher Bay and Hall Beach.


## ACKNOWLEDGEMENTS

The author gratefully acknowledges continuing aircraft and logistical support provided by the Polar Continental Shelf Project and their staff, particularly during carvingstone investigations. Numerous carvers, pilots, geologists, company and government personnel and other northerners have greatly assisted the author at various stages of preparing this report.


## VICTORIA ISLAND

Victoria Island is underlain by crystalline Precambrian basement rocks, a concordant sequence of comprising clastics, carbonates and gypsum-anhydrite (Table 4-2). A younger unit, the Natkusiak Formation composed of basalt flows and volcaniclastics disconformably overlies the sedimentary rocks of the Shaler Group and follows the axis of the Holman Island Syncline. Closely related to these volcanics are widespread diabase-gabbro sills and dykes (Christie, 1964) that have the same age (650 Ma B. P.), chemical and petrological characteristics as the Coronation sills to the south (Baragar, 1977).

The above mentioned rocks are exposed in a structure called the Minto Arch (Fortier and others, 1963) that dominates the geology of northwestern Victoria Island (1 in Fig. 4-1). Precambrian strata of the Minto Arch form a northeast trending synform, named the Holman Island Syncline (Figs. 4-2 and 4-3), however, the Minto Arch became a positive topographic

feature during the Paleozoic. It underlies most of the Diamond Jenness Peninsula, the Saneraun Hills and the Shaler Mountains (Fig. 4-2).

"The angular discordance between the lower Palaeozoic and the Precambrian rocks of the Minto Arch demonstrates that the Walker Bay Anticline and the Holman Island Syncline were folded prior to deposition of the earliest Palaeozoic rocks in the area. Later crustal movements, however, are clearly responsible for the present position of the Minto Arch as a structural high, or uplift, with homoclinal sequences of Palaeozoic rocks dipping away from the Arch. There is no evidence in the stratigraphic column of the map-area to suggest that the Minto Arch underwent sudden uplift at any time. The essentially homoclinal sequence of Upper Cambrian(?) to Upper Devonian strata that extends through Prince Alberta Peninsula into northeast Banks Island presumably developed as a result of the positive movement that effected the Minto Arch. The uplift is, therefore, presumably Upper Devonian or later. Lower Cretaceous rocks rest unconformably upon the Palaeozoic strata and this suggests that the uplift of the Minto Arch took place prior to the Lower Cretaceous.

The Boothia Arch, east of the map-area, is known to have moved positively, and relatively violently, in late Silurian to early Devonian time. Latest Silurian and early Devonian rocks are not exposed on Victoria Island; consequently there is no record of events for this period. It is conceivable that the Minto Arch moved in late Silurian or early Devonian time (i.e., at the time of movement of the Boothia Arch), but this is improbable" (Thorsteinsson and Tozer, 1962, p. 72).

***TABLE 4-2: TABLE OF FORMATIONS, VICTORIA ISLAND***

| | |
|---|---|
| QUATERNARY | |
| 18 | Areas of thick glacial drift; mainly morainal; outcrops of bedrock are very scarce. |
| | Unconformity |
| ORDOVICIAN | |
| 12 | BLUE FIORD FORMATION: limestone shale. |
| SILURIAN | |
| 11 | READ BAY FORMATION: limestone dolomite, shale. |
| CAMBRIAN? ORDOVICIAN AND SILURIAN | |
| 10 | 10a, Cambrian? sandstone, minor shale, siltstone, dolomite; 10b, Ordovician and Silurian, dolomite, minor chert, shale, sandstone. |
| | Unconformity |
| LATE PRECAMBRIAN | |
| 9 | Gabbro dykes and sills; sill not mapped. |
| 8 | NATKUSIAK FORMATION: basalt flows; minor aggolmerate. |
| | Low angle unconformity |
| | SHALER GROUP (3-7c) |
| 7c | KUUJJUA FORMATION: mainly coarse grained quartz sandstone, minor conglomerate and limestone. |
| 7b | UPPER KILIAN FORMATION: Sabkha-environment red and tan shaly limestone, grey sabkha carbonates with gypsum beds, and red siltstone. |
| 7a | LOWER KILIAN FORMATION: varicoloured evaporitic mudstone and bedded bypsum/anhydrite. |
| 6 | WYNNIATT FORMATION: limestone; minor dolomite, shale, sandstone. |
| 5 | MINTO INLET FORMATION: gypsum, anhydrite, minor sandstone, limestone, shale, dolomite; siltstone. |
| 4 | REYNOLDS POINT FORMATION: limestone, sandstone; minor siltstone, shale. |
| 3 | GLENELG FORMATION: sandstone, limestone, sandstone, dolomite, conglomerate. |
| | Unconformity |
| 2 | HADLEY BAY FORMATION: Quartzite, sandstone, rare conglomerate and dolomite. |
| | Unconformity |
| 1 | Pink, coarse grained granodiorite |

## NORTHWEST VICTORIA ISLAND RECONNAISSANCE

Panarctic Oils Ltd.
P.O. Box 190
Calgary, Alta., T2P 2H6

Copper, Silver
77 G/13; 78 B/14;
87 E/13, F/16, G/1,
H/3,4,7,9,10,15,16;
88 A/1
70°52'-72°08'N,
111°30'-116°30'W

### REFERENCES

Baragar (1976, 1977): Baragar and Loveridge (1982); Christie (1964); Jefferson (1985); Jefferson and others (1985); Newbury (1969); Palmer and Hayatsu (1975); Thorpe (1972); Thorsteinsson and Tozer (1962).

DIAND assessment report: 081858.

### PROPERTY

Twenty-six prospecting permits (974-997, 1075 and 1076) encompass 643,120 ha.

### LOCATION

The permit areas cover most of the volcanic rocks of the Natkusiak Formation of northwestern Victoria Island (Fig. 4-2). The permits can be divided into two groups. The southwest block, ten permits, occupies the central core of Diamond Jenness Peninsula, immediately south of the Kuujjua River. The second group (16 permits) includes most of the northeast-trending Saneraun Hills and Shaler Mountains (Figs. 4-2 and 4-3). The area is 50 to 275 km northeast of Holman Island and an average of 425 km northwest of Cambridge Bay, the only established communities on Victoria Island. However, the Panarctic Oils Ltd. mineral camp was resupplied by Twin Otter STOL aircraft from their base at Rea Point, Melville Island, 500 km to the northeast.

### HISTORY

The occurrence of copper on Victoria Island was first reported by V. Steffanson in 1913 on the basis of reports given to him by Inuit in Prince Albert Sound. However, Thorsteinsson

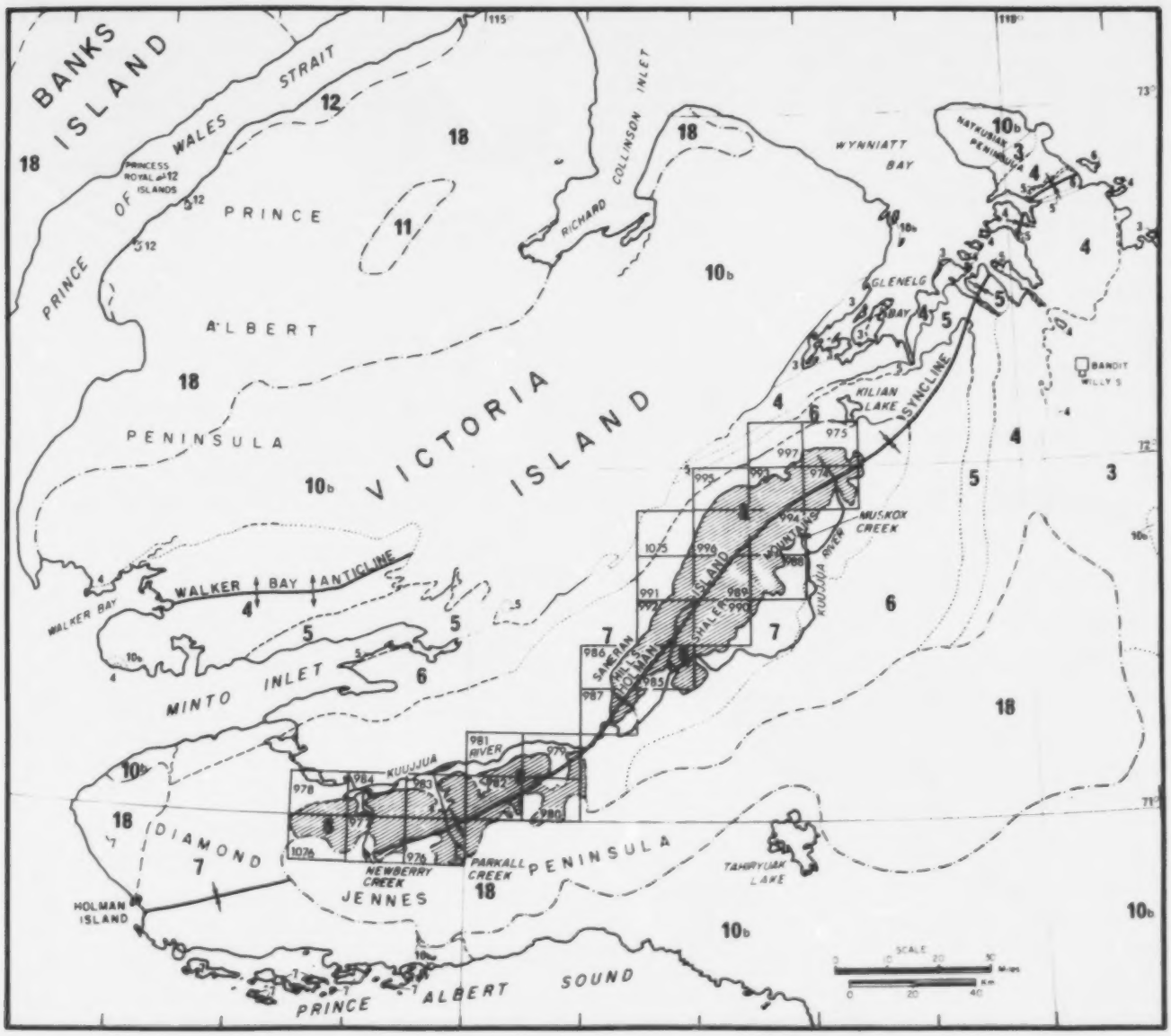



*FIGURE 4-2: Map of Precambrian geology and permit areas, northwestern Victoria Island, modified (from Thorsteinsson and Tozer, 1962). See Table 4-2 for legend.*

and Tozer (1962, p. 77) were the first people of European origin to observe copper ('a few small flecks and flakes') "in situ" in the volcanic rocks of the Natkusiak Formation.

During 1968-70, copper exploration in the Coppermine River area 'spilt over' to Victoria Island as the Muskox Syndicate, Grandroy Mines Ltd. and the M.J. Boylen Engineering Co. Ltd. prospected and explored the Natkusiak Formation for copper. Numerous copper showings were discovered and limited mapping, drilling and geophysics were done in an attempt to delineate the economic potential of some of the best showings. Many of the initial targets were vein-type deposits, associated with a series of north-trending faults that transect the Proterozoic section (Thorpe, 1972, p. 141-145).

In 1982, a four-person crew of Panarctic Oils Ltd. geologists collected stream water and stream sediment samples that were assayed for uranium, copper, silver, gold, nickel, iron and/or chromium (Gibbins, 1985). They also examined four areas of known copper showings. Four main types of copper-silver showings were recognized in these areas; a) vein type - mainly massive chalcocite with minor native copper, b) vesicule and void fillings vesicular and pyroclastic basalts, c) fracture fillings - similar but narrower than veins, and d) disseminated copper minerals in massive or pyroclastic basalts. The fracture fillings are commonly malachite and/or azurite smears along fracture planes. They occasionally have high silver and several spectacular pieces of native copper have been obtained from them.

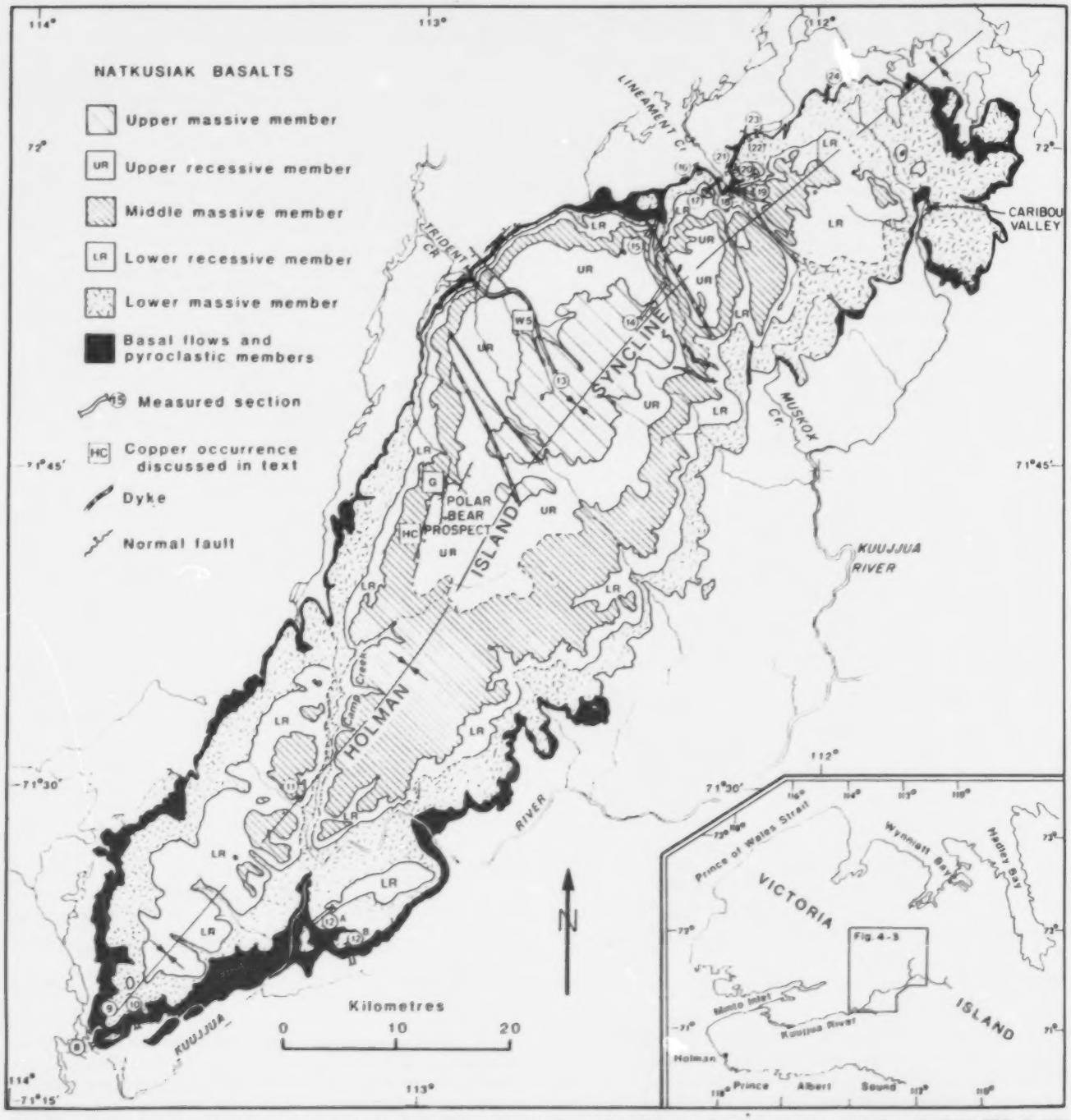



*FIGURE 4-3: Geological map of Natkusiak basalts in the Northeast sector of Holman Island Syncline. Copper occurrences are shown by letter (W5, G, HC). Numbers refer to measured sections (from Jefferson and others, 1985).*

Panarctic Oils Ltd. acquired Prospecting Permits 974 to 997 on February 1, 1983, and 1075 and 1076 in 1985.

In 1983, several hundred stream sediment samples were collected and analyzed to complete coverage of the area. A total of 16 copper-silver anomalies were outlined and followed up with prospecting and geological mapping. The area around the W-5 showing (Trident Creeks area), which had been discovered and drilled by the Muskox Mines Syndicate in the late sixties (Thorpe, 1972, p. 142), was prospected. Finally, a stratigraphic cross-section of lithologies and units in the Natkusiak Formation volcanics was established.

## DESCRIPTION

The Natkusiak Formation, as defined by Thorsteinsson and Tozer (1962, p. 37) is a sequence of volcanic rocks that consists of dark-coloured, basaltic flows and pyroclastic sediments. This formation rests disconformably on the Kuujjua and Kilian Formations of the Shaler Group and includes the youngest Precambrian layered rocks in the area. The Natkusiak Formation is confined to Victoria Island, where it is exposed in two detached belts along the axis of the Holman Island Syncline. Landsat images clearly show a series of northwest-trending fractures that extend great distances into the Paleozoic sediments.

The formation is named for Natkusiak, late resident of Holman and well-known travelling companion of Arctic explorer Vilhjalmur Steffansson. Natkusiak's grave is in the Holman cemetery. The type section of the Natkusiak Formation is some 25 km south of Glenelg Bay, northern Victoria Island.

The formation attains a maximum thickness of about 300 m at about longitude 112°30'W. Where individual flows have been recognized, they are about 30 m thick. Amygdules commonly characterize the lower and upper parts of flows, whereas the middle section is dense basalt. Red and green agglomerate, commonly poorly indurated and cut by thin veins of calcite, is locally present at the base of the formation and ranges to 100 m in thickness. The agglomerate comprises fragments of volcanic rocks, bombs, and baked sedimentary rocks of various types that are embedded in a matrix of calcite and tuff. The volcanics are commonly chloritized and epidotized.

Baragar (1976 and 1977) measured several sections of Natkusiak Formation volcanics for detailed geochemical and paleomagnetic studies. He related them to the Franklin magmatic province (or Franklin Magnetic Interval) of late Hadrynian time (i.e., circa 600 Ma B.P.). They are the only known surface eruption of this event that also includes the Coronation dolerite sills and sheets (Christie, 1964) and the Franklin diabase dykes.

The late Hadrynian age assumed for the magmatic rocks is based upon a K-Ar age determination of 640 Ma for one of the sills reported by Christie (1964) and a K-Ar isochron age of 625 Ma determined for the basalts of Palmer and Hayatsu (1975). Confirmation of these ages by the Rb-Sr isochron technique was attempted. Unfortunately, the Rb/Sr ratios in the dolerites are uniformly low with limited spread. They cluster about a 2.2 Ga reference isochron (Baragar and Loveridge, 1982). However, an age of 2.2 Ga is geologically unreasonable. This result is thought to reflect contamination of late crystallizing fractions of the magma by solutions from Archean basement, through which the magma passed. A 'secondary' isochron indicating 384 Ma is also unexplainable, but may be due to contamination or post-Devonian uplift.

"The Natkusiak basalts are typical plateau basalts which have erupted, for the most part, in a subaerial environment. Each flow comprises a massive base, with the exception of a thin amygdaloidal zone at the bottom, and highly amygdaloidal top. The top ranges from 1/4 to 1/10 the thickness of the flow, although some thin flows are almost entirely amygdaloidal. Most flows have a pronounced 'sheeting' structure which is parallel or subparallel to their contacts, and is most closely-spaced at their tops. Weathering of the sheeted basalts is commonly severe. The thinner flows are sheeted throughout and the attendant weathering makes a fresh sample difficult to obtain. In the thicker flows, the lower portion is generally unsheeted and fresh. Almost certainly the sheeting structure is inherited from a primary feature such as flow layering, but it has been much modified by weathering and produces a very friable rock" (Baragar, 1976, p. 350).

The Natkusiak Formation contains copper-bearing flood basalts similar to those of the Coppermine River area and the Keeweenawan Peninsula of Upper Michigan. Reconnaissance prospecting in the late sixties resulted in the discovery of more than 100 showings of chalcocite, bornite, malachite, azurite, chalcopyrite and native copper (Thorpe, 1972, p. 142).

Newbury (1969) studied the copper showings of claims on the southwestern block of Natkusiak Formation (Diamond Jenness Peninsula). He described epigenetic native copper in permeable zones, prehnite-bearing vugs, amygdules and fractures. Chalcocite apparently formed at a water table from vadose copper-bearing fluids.

Jefferson and others (1985) subdivided the Natkusiak Formation into six litho-stratigraphic members (Table 4-3). Jefferson (1985) defined a sixth, uppermost unit of the Shaler Group, the Kuujjua Formation. The Kuujjua Formation is a distinctive quartzarenite that is restricted to the southwest half of the Holman Island Syncline area. It unconformably overlies the Kilian Formation and is in turn unconformably overlain by the Natkusiak Formation.

Jefferson (1985) also noted that the evaporites, sabkha limestones and dolostones of the upper Kilian Formation are lithologically similar and time equivalent to the Thundercloud Formation of the Mackenzie Mountains. However, evaporites and red alluvial mudstones of the Redstone River Formation, which overlies the Thundercloud Formation, appear to have no counterparts on Victoria Island. In addition, there are several other variations in the geology of the two areas (Jefferson, 1985, p. 108-109).

## CURRENT WORK AND RESULTS

### 1984

A 10-person crew spent the 1984 field season examining 20 areas of stream sediment geochemical anomalies; work included measuring and mapping across several stratigraphic sections and prospecting. Numerous mineral showings were discovered and have been classified into several distinct types (Table 4-4). Detailed work was concentrated in two areas; Trident Creek area and Polar Bear Prospects area, both of which lie along the western side of the northern block of Natkusiak Formation (Fig. 4-3)

**Trident Creek Area:** Consultant John Reedman mapped and prospected 180 km² of the Trident Creek area (W-5 in Fig. 4-3), where the Muskox Mines Syndicate had explored and drilled the W-5 showing in the late sixties. A number of copper showings were discovered and sampled. Assays of 121 river-gorge-talus samples ranged from 34 to 2,000 ppm Cu and showed an erratic distribution when plotted on a base map. No further work at the W-5 showing was recommended because copper is restricted to narrow chalcocite veins (type 4 of Table 4-4) which are found along minor northwest-trending fractures and are discontinuous along strike and dip, and to small disseminations of native copper of limited extent in flow tops (type 3). However, talus and felsenmeer sampling over a larger region

***TABLE 4-3: STRATIGRAPHY OF THE NATKUSIAK FORMATION, VICTORIA ISLAND (from Jefferson and others, 1985).***

| Formation | Member (Thickness) | Lithology |
|---|---|---|
| DYKES (cm to dm wide) | | Massive jointed diabase. Intrude entire Shaler Group and Natkusiak basalts. Two orientations, NE and NW. |
| SILLS (O to >60 m thick) | | Massive, columnar-jointed diabase: locally well developed internal layering, cumulate textures and granophyre. Intrude mainly Shaler Group, thin sills in basalts. |
| NATKUSIAK BASALTS | UPPER MASSIVE (≥150 m) | 4-8 flows: blue-green, orange-brown weathering, massive blocky to columnar jointed. Forms top plateau in Trident Creek area. |
| (>1100 m, 40-50 flows) | UPPER RECESSIVE (≤500 m) | 20-29 flows: dark green, mainly green-brown weathering, rubbly flaggy breaking. |
| | MIDDLE MASSIVE (80-90 m) | 4-6 flows: blue-green, orange-brown weathering, massive blocky to columnar jointed, forms top plateau throughout much of region. |
| | LOWER RECESSIVE (20-200 m) | 4-9 flows: dark brown-green to green, drab green-brown weathering. Locally includes pyroclastic rocks and pillowed lavas. |
| | LOWER MASSIVE (~75 m) | 2-5 flows: blue-green to green-grey, orange-brown to brown weathering, massive, cliff-forming, blocky to columnar jointed, forms second lowest plateau. |
| | PYROCLASTIC (0- >100 m) | Lower ~10 m: locally sedimentary, green to maroon, upper ≤90 m: lithic lapilli tuff, local tuff-breccia, green (bottom) to maroon (top). |
| | BASAL (0- >70 m) | 0-4 flows, blue-green to green-brown, orange-brown to green-brown weathering, massive, cliff-forming to rubbly. Locally spheroidally weathered or includes hyaloclastic breccia with lithic and volcanic inclusions; isolated to layered pillowed flows in amygdaloidal hyaloclastic matrix. Forms plateau in central and southwestern areas. |
| | LOW-ANGLE UNCONFORMITY | |
| SHALER GROUP | | |

***TABLE 4-4: COPPER OCCURRENCES AND ALTERATION, NATKUSIAK BASALTS AND UPPER KILIAN FORMATION (from Jefferson and others, 1985).***

| Type | Mineral | Host Rock | Associated Minerals[1] | Shape of Occurrence |
|---|---|---|---|---|
| 1A | Native Copper (disseminated) | densely amygdaloidal parts of flows, any member | prehnite, quartz, chlorite, pumpellyite, calcite. | disseminated within amygdules and gas cavities, at junctions between prehnite crystals and fine wires and blebs within botryoidal masses of prehnite. |
| 1B | Native Copper (disseminated) | middle and upper massive members: as 1A but with associated red interflow mudstones | prehnite, pumpellyite, chlorite, quartz, calcite; similar alteration in red mudstones. | thin veinlets in joints, disseminated in amygdules and in massive basalt, minor copper in veinlets and reduction spheres in red mudstones. |
| 2 | Native Copper (veins) | massive jointed flows with knobby, sparsely amygdaloidal texture | microscopic prehnite-pumpellyite-quartz | crystalline dendritic copper in the shape of blebs, and thin to thick veins along joints. |
| 3 | Native Copper (disseminated) | massive flows, any member | none (other than typical whole rock alteration) | disseminated fine to microscopic flecks in massive basalt. |
| 4 | Chalcocite (bornite, tetrahedrite, pyrite) (veins) | recessive members (mainly) | quartz, calcite, hematite, chlorite, pumpellyite | veins and vein-sets, commonly trending 120-130°, expanding laterally in amygdaloidal flow tops. |
| 5 | Pyrite, chalcopyrite (±arsenopyrite) | pyroclastic member | not known | very fine grained, disseminated in matrix and outlining clasts; locally forms massive clasts. |
| 6 | Chalcocite (veinlets) | upper Kilian, cream limestone member | none documented | steeply dipping veinlets near overlying Natkusiak basalts. |

[1] Associated minerals listed approximately in order of decreasing proximity to copper, minor minerals in brackets.

to identify very large targets like extensively mineralized flows was recommended. The Trident Creek area contains the thickest section of the Natkusiak Formation.

**Polar Bear Prospects:** This area is west of the center of the northern block of Natkusiak Formation and contains geochemical anomalies 4 and 5 identified during the 1983 field season. In 1984, surface prospecting was carried out along lineaments and areas of geochemical anomalies, and 65 additional geochemical samples were collected in areas of high copper potential. Numerous types of copper showings were found. Clearly the most important discoveries were the Holy Cow and Genesis showings, where spectacular veins of native copper fill vertical to near vertical fractures in the middle massive basalt members.

> At the **Genesis showing** (G in Fig. 4-3) types 1B and 2 native copper occur within the top flow of the middle massive member. (This) flow top is altered extensively to chlorite-pumpellyite and transected by numerous quartz-prehnite veinlets containing late calcite. Some of these veins also extend up into the recessive flow. Native copper is disseminated throughout the flow top and concentrated near the veined zones. One of the veins, up to 40 cm wide and trending 130°, cuts deeper into the underlying flow and consists of native copper disseminated in prehnite, quartz, chlorite and pumpellyite. Late sparry calcite fills large voids. The veins preferentially fill the 035°-050° oriented portions of polygonal columnar joints in the massive basalt (Jefferson and others, 1985, p. 212).

At the **Holy Cow showing** (HC in Fig. 4-3), similar veins strike approximately 125° and also fill triple junctions between polygonal joints. Pieces of native copper from exhumed veins range from 1 to 300 kg weight (Fig. 4-4) and assay as high as 98.4% copper and 70 ppm silver (Jefferson and other, 1985, p. 211).

**Camp Valley Area (Fig. 4-3):** This area corresponds to geochemical anomaly 2 where a number of stream sediment samples anomalous in copper and gold had been identified in the 1983 work. In 1984, a grid was established and orientation soil geochemistry and VLF-EM surveys were done.

**Lineament Creek Area (Fig. 4-2):** Geochemical anomaly 3 contains very fine-grained chalcopyrite-pyrite in matrix and clasts of lapilli tuff. This is also known as the Fault Creek area.

**Newbury Creek Area (Fig. 4-2):** This area corresponds to anomaly 6 of the 1983 geochemical survey and an area of copper showings examined by Grandroy Mines Ltd. in 1968 (Newbury, 1969). A number of copper showings were discovered, including disseminated native copper in flow tops and massive basalts, replacement chalcocite in vesicular basalt and native copper in a basaltic flow in the lower recessive member of the Natkusiak Formation. This unit, a 'mega-amygdaloidal' basalt flow, is found in an extensive area on the east side of Newbury Creek. It contains mega-amygdules, 10 to 50 cm in diameter, filled with prehnite, silica, wall-rock, native copper and malachite.

**Parkall Valley Area (Fig. 4-3):** This area contains the thickest section of the volcaniclastic member of the Natkusiak Formation. Both silver (7) and copper (8-9) geochemical anomalies are found in an area of pyroclastics.

**1985**

During June and July 1985, 17 holes (396.3 m) were drilled in the Parkall Valley area (southeast corner of Prospecting Permit 983) and the Newbury Creek area (south central Prospecting Permit 984).

*FIGURE 4-4: Massive copper plates at Holy Cow showing.*

**Newbury Creek Area - PP 984:** Eleven holes (300.9 m) tested a series of horizontal zones of chalcocite - native copper-malachite-prehnite-quartz-calcite minerals. These zones are parallel to horizontal flow banding in the Lower Recessive Member of the Natkusiak Formation.

All but three holes, abandoned in permafrost, reached their targeted depths without encountering significant copper minerals. Only scattered grains of copper and occasional veinlets of chalcocite were encountered.

**Parkall Valley - PP 984 and 977:** Six holes (95.7 m) tested a series of vertical chalcocite veins and veinlets in the Volcaniclastic Member of the Natkusiak Formation. These veinlets are associated with light green zones of alteration to bentonite. This bentonite alteration caused problems in core drilling and forced 4 of the 6 holes to be stopped short of the main target and produced inconclusive results.

## WILLY'S AND BANDIT CLAIMS

| | |
|---|---|
| William Reid | Copper, Cobalt, Silver |
| P.O. Box 56 | 78 B/7 |
| Yellowknife, NWT X1A 2N1 | 72°15'N, 109°30'W |

### REFERENCES

Christie (1964): Thorsteinsson and Tozer (1962).
DIAND assessment report: 081833.

### PROPERTY

WILLY'S and BANDIT claims.

### LOCATION

The claims are on northern Victoria Island, 350 km north of Cambridge Bay, 30-35 km west of Hadley Bay and 25 km south of the Natkusiak Peninsula (2 in Fig. 4-1 and upper extreme right in Fig. 4-2).

### HISTORY

The copper-silver gossans were first observed from the air in the summer of 1981. The following summer, WILLY'S and BANDIT claims were staked and recorded by William Reid of Yellowknife.

Ida Point Minerals Ltd. and Noranda Exploration Ltd. geologists made brief field examinations in 1981 and 1982 respectively.

## DESCRIPTION

The claims are underlain by Glenelg Formation, the basal member of the Proterozoic Shaler Group (Table 4-2). The Glenelg Formation is mainly flat-lying quartz-rich sandstone with minor stromatolitic dolomite and siltstone (Thorsteinsson and Tozer, 1962). Prominent diabase and gabbro dykes and sills, that characterize the Precambrian terrain of Banks and Victoria Islands (Christie, 1962), are well developed in the claim area (Fig. 4-5).

Several areas of obvious gossan are present in the claim area. However, the most spectacular is an area of black gossan 2.5 km north of 'Willy's Lake' near the centre of the BANDIT claim (Fig. 4-5). It consists of a flat mound of loose pyrite sand and alteration products about 100 m across and 3 to 4 m high (Fig. 4-6). The alteration products are mainly iron oxides and sulphates. Pale green to aquamarine melanerite, $FeSO_4 \cdot 7H_2O$, was found a few centimetres below the surface. A strong sulphide odour is present and solutions draining from the black gossan have produced a large brown iron stain on dolomite in the adjacent creek bed. The black gossan has all the appearances of an extinct mineralized geothermal system, but samples of the black gossan usually contain less than 0.10% Cu.

Numerous yellow to red to orange-brown gossans are also present in a 10 by 5 km area. The sulphide minerals may occur as veins (usually in dolomite units), or disseminated in more permeable sandstone. Two relatively important copper showings are found in sandstone, less than 250 m west of the black gossan, and on the west side of the north arm of Willy's Lake, 3 km south of the black gossan. Grab samples from these showings ranged from 0.040 to 0.575% Cu, 40 to 300 ppm Co and 0.34 to 35.3 g/t (ppm) Ag. Assays for gold are low, normally less than 0.10 g/t Au.

Chalcopyrite and chalcocite are the two principal copper minerals. They are usually accompanied by pyrite and secondary malachite and/or erythrite or 'cobalt bloom'. Well formed hexagonal crystals of specular hematite can be found lining vugs.

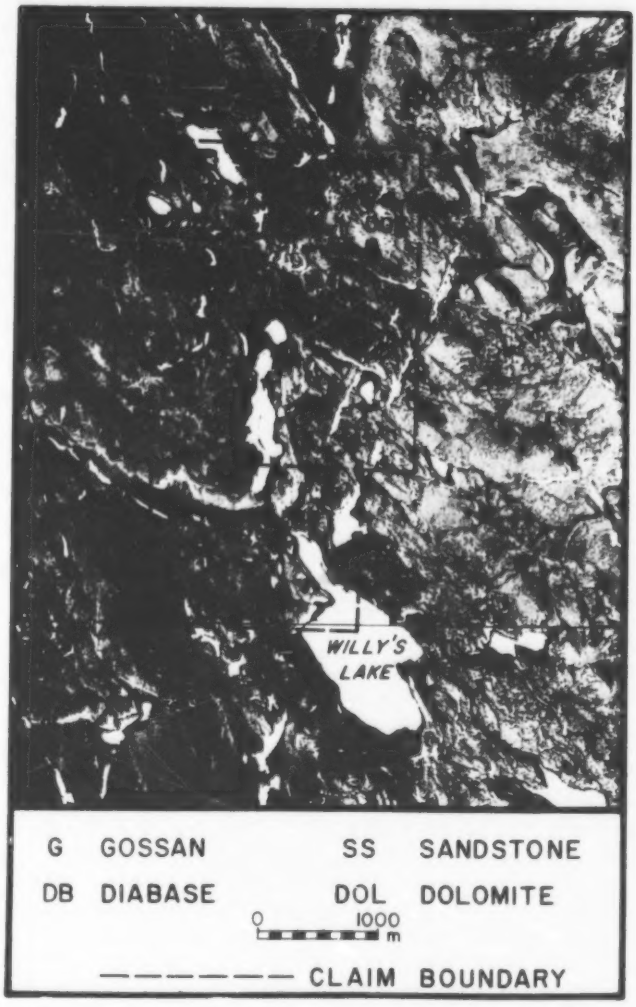



*FIGURE 4-5: Geology of WILLY's and BANDIT claims, northeast Victoria Island.*

## CURRENT WORK AND RESULTS

In August 1984, numerous small pits were made in the area and samples were collected for assay.

# CENTRAL ARCTIC: CORNWALLIS LEAD-ZINC DISTRICT

The Cornwallis Lead-Zinc District (Fig. 4-7) was controlled by the same tectonic elements that formed the Cornwallis Fold Belt, which is a major structural feature of a steep-sided anticlinorium of Proterozoic to Devonian formations (Table 4-5) that overlies a basement horst (Kerr, 1977a and 1977b). The deformation in the Cornwallis Fold Belt can be attributed to several pulses of differential vertical uplift of the underlying Boothia Horst. It was formed mainly by the Cornwallis Disturbance, which consisted of four main pulses or cycles that began with uplift and erosion of the fold belt and was follow-

*FIGURE 4-6: Photo of black gossan, BANDIT claim.*

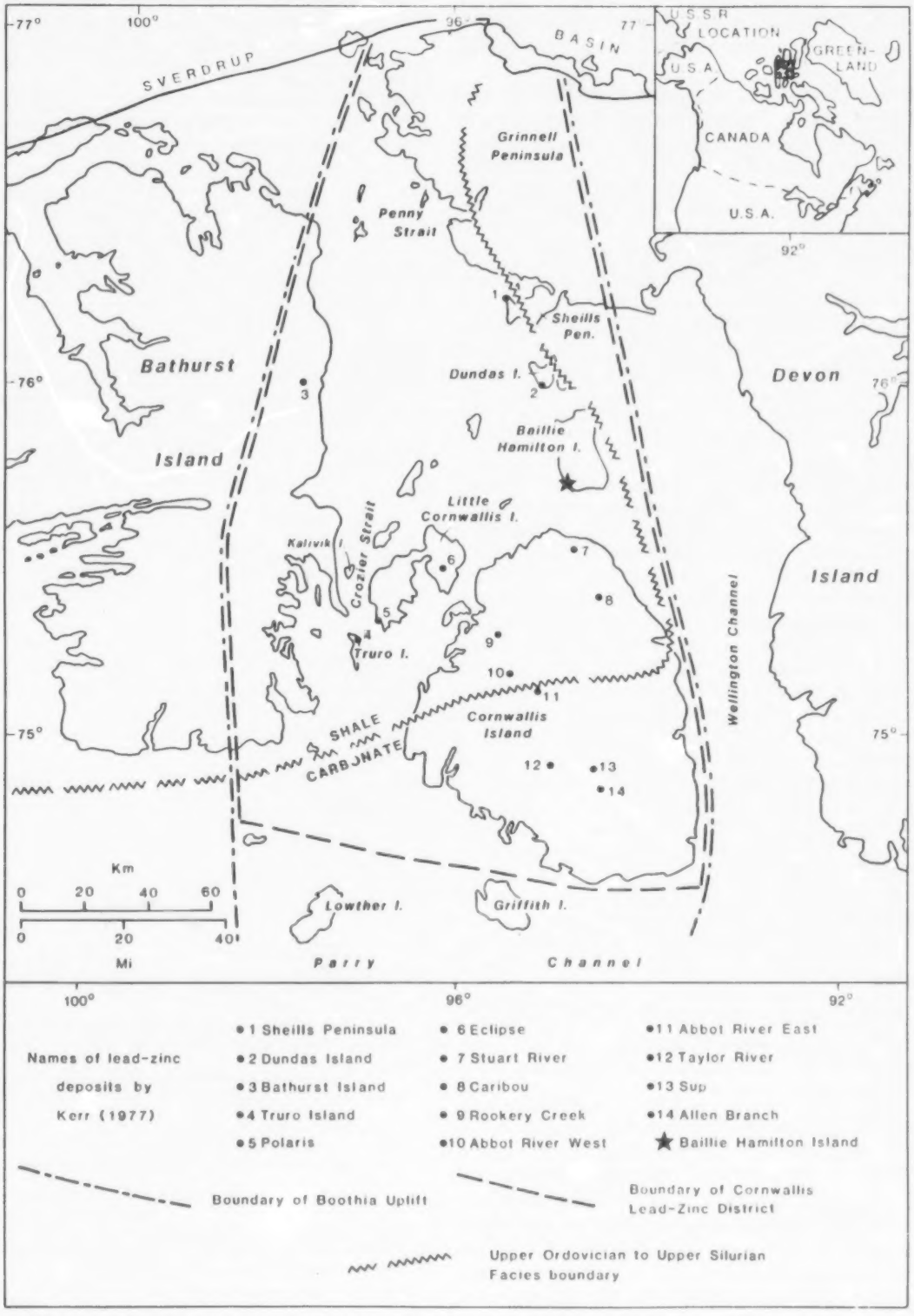



*FIGURE 4-7: Index map of the Cornwallis Lead-Zinc District (from Kerr 1977b and Thorsteinsson, 1984).*

ed by broader regional subsidence and resumption of deposition (Kerr, 1977a). The Cornwallis Disturbance lasted from Early Silurian to Late Devonian. Each uplift or tectonic pulse is marked by a regional unconformity of varying local significance (Table 4-5).

The Cornwallis Fold Belt is centered at Resolute Bay in the Central Arctic of Canada. The northern half coincides with the Cornwallis Lead-Zinc District of Kerr (1977b) and includes all of Cornwallis Island and Little Cornwallis Island, the eastern margin of Bathurst Island and the west and central two-thirds of the Grinnell Peninsula of northwestern Devon Island (Fig. 4-7).

In addition to establishing the geological framework of the region, Kerr (1977a, 1977b) outlined four probable controls on mineralization (Table 4-6) that are remarkably consistent with regard to lead-zinc deposits and prospects in the region, including the large, high-grade Polaris deposit. The region has been mapped geologically by Thorsteinsson and Kerr (1968) and Thorsteinsson (1973).

The Cornwallis Lead-Zinc District of the Central Arctic was the scene of continued mineral exploration in 1984, as Cominco Ltd, did IP surveys at Kalivik Island, 20 km north-northwest of the Polaris Mine, at the Eclipse property 30 km northeast of Polaris and in the area immediately south of the mine.

Tanqueray Resources Ltd. prospected and sampled prospecting permits areas on Baillie Hamilton Island, 7.5 km northeast of Polaris (Figure 4-7).

At the Polaris Mine (see Chapter 2), continuous surface and underground exploration drilling (nearly 13,000 m) increased the total and measured reserves of ore by 18% or 3.1 Mt (Cominco Ltd. Annual Report, 1984). However, in 1985, exploration decreased with falling zinc prices and drilling at the mine accounted for virtually all of the exploration in the area. This drilling, along the east side of the Keel ore zone, completed the definition of the main orebody.

In 1984, 120 holes (12,800 m) were drilled at Polaris, compared with 80 holes (9,200 m) in 1985.

***TABLE 4-5: STRATIGRAPHY AND TECTONIC EVENTS OF THE CORNWALLIS LEAD-ZINC DISTRICT (from Kerr, 1977b).***

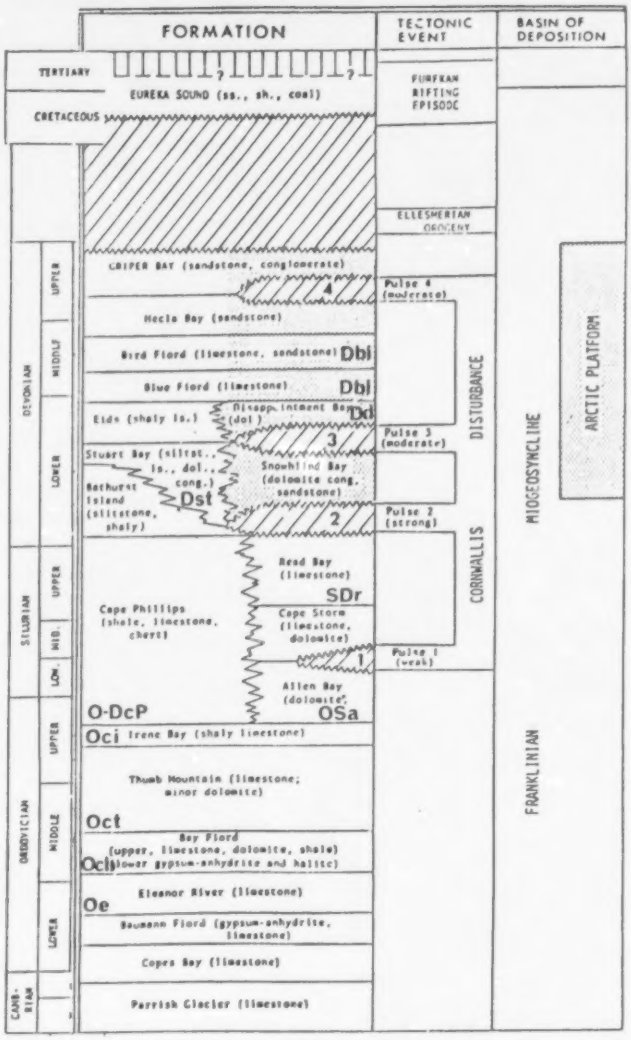



***TABLE 4-6: CONTROLS ON MINERALIZATION IN THE CORNWALLIS LEAD-ZINC DISTRICT (from Kerr, 1977b).***

(1) the host is the upper bioclastic part of the Ordovician Thumb Mountain Fm. (12 of 15 showings, the other 2 are also in carbonate).

(2) the host rock is locally brecciated dolomite (15 of 15 showings, sparry dolomite veining known as pseudobreccia is common).

(3) the showings lie within the bounds of the Cape Phillips shale basin and structurally higher than the shale (11 of 15 showings, the Cape Phillip shales may be a source of the metals).

(4) the host is overlain unconformably by the Disappointment Bay Fm., (Pulse 3 in Table 4-5), (7 of 8 showings, one is in the Disappointment Bay and 6 are unknown).

## KAL and VIK CLAIMS

Cominco Ltd.
1700-120 Adelaide St.
Toronto, Ontario, M5H 1T1

Zinc, Lead
68 H/10
75°31'N, 97°15W

### REFERENCES


Kerr (1977a, and 1977b).
DIAND assessment report: 082053.


### PROPERTY

KAL and VIK.

### LOCATION

The claims include all of Kalivik Island, a small island less than 10 km² that lies near the centre of Crozier Strait (Figure 4-7). Kalivik Island is 5 km west of Royale Point and 15 km north-northwest of the Polaris Mine, both on Little Cornwallis Island. The closest community is Resolute Bay, 120 km to the southwest.

Kalivik is an Inuktutut word that means 'place to drag things to'.

### HISTORY

The claims were staked in the spring of 1983.

### DESCRIPTION

Kalivik Island is a small island with low topographic relief. Frost-shattered felsenmeer surface exposure suggests that it is mainly underlain by Devonian Disappointment Bay Formation. These rocks comprise bedded, vuggy, porous, bituminous dolomites with horizontal to westerly dipping attitudes. Because the basal chert-chip conglomerate is not exposed, it is impossible to determine the local thickness of the Disappointment Bay Formation or confirm that the Thumb Mountain Formation underlies it. Red, fine-grained, dolomitic sandstone along the southeast coast may be Snowblind Bay Formation.

Kalivik lies well within the Cornwallis Fold Belt and Cornwallis Lead-Zinc District (Kerr, 1977a and 1977b) and, as far as can be determined, it meets at least two of Kerr's controls on mineralization (Table 4-5). It lies within the bounds of the Cape Phillips Formation shale basin (Fig. 4-7) and is overlain by Disappointment Bay Formation.

### CURRENT WORK AND RESULTS

In 1984, a combined induced polarization (IP) and resistivity survey was carried out on Kalivik Island, including 13 km of reconnaissance and 1 km of detailed survey. Remnant salt from sea water in permafrost and poor ground contact adversely affected the resistivity survey; however, the chargeability results are not affected by permafrost or salt content. The reconnaissance IP survey identified, and detailed work confirmed, a zone of high chargeability readings. The most likely source is disseminated metallic sulphide minerals 100 to 200 m below the surface.

Geological investigations were recommended, but it is not know if they were undertaken.

## PROSPECTING PERMITS 1008-1010

Tanqueray Resources Ltd.
100, 625-4th Avenue S.W.
Calgary, Alta., T2P 0K2

Lead, Zinc
58 G/14
75°52'N, 94°30'W

### REFERENCES

Kerr (1977a and 1977b); Throsteinsson (1984, 1973); Thorsteinsson and Kerr (1968).

DIAND assessment report: 082054.

### PROPERTY

Prospecting Permits 1008-1010.

### LOCATION

The three prospecting permits include all of Baillie Hamilton Island except for the northeast coast. Baillie Hamilton Island is 120 km north of Resolute Bay, the transportation hub of the central Canadian Arctic (Fig. 4-7).

### HISTORY

The permits were granted by the Department of Northern Affairs, February 1, 1984.

### DESCRIPTION

Baillie Hamilton Island is part of the cratonic Boothia Uplift (Cornwallis Fold Belt of Kerr, 1977a) and falls within the Cornwallis Lead-zinc District of Kerr (1977b) (Fig. 4-7). The local geology was mapped by Thorsteinsson and Kerr (1968) and revised by Thorsteinsson (1973 and 1984 - see Fig. 4-8).

> The strata exposed on Baillie Hamilton Island are divisible into two structurally conformable sequences separated from one another by an angular unconformity (Fig. 4-8). The older sequence includes the Cape Phillips Formation and overlying Sophia Lake Formation. These formations outcrop in eastern parts of Baillie Hamilton Island, and together they constitute surface exposures for over more than three quarters of the island. The regional strike of these formations is northerly, and they generally dip eastward. The younger sequence is made up of the Disappointment Bay Formation and an overlying unnamed limestone unit. These formations occupy a narrow strip of territory along the west side of the island. The regional strike and dip of these rocks are north and west, respectively. Both the older and younger sequence are cut by steeply dipping, mainly north-striking normal faults (Thorsteinsson, 1984, p. 272).

In 1983, Thorsteinsson discovered a small, but rather spectacular sulphide deposit (Shore showing) near the southwestern extremity of Baillie Hamilton Island at 75°46'16"N, 94°44'08"W (Thorsteinsson, 1984). It consists mainly of pyrite and marcasite with small amounts of galena and occurs along the crest of an anticline that is exposed at the base of northwest-trending sea cliffs. The sulphides have infilled the pores and vugs in dolomite in the upper part of the Lower Devonian Disappointment Bay Formation.

This discovery is the fifteenth known lead-zinc showing in the Cornwallis Lead-Zinc District (Fig. 4-7) and is of interest for two reasons: 1) sulphide deposits in the Disappointment Bay Formation are rare (Kerr, 1977b), and the present deposit adds to the interest in this formation as a potential host for lead-zinc ore bodies in the Cornwallis district; and 2) there is a possibility, however tenuous, that at this locality the Disappointment Bay Formation lies directly on the Thumb Mountain Formation and the deposit represents the uppermost mineralized part of an ore body at depth in the latter formation (Thorsteinsson, 1984).

### CURRENT WORK AND RESULTS

In July 1984, a four-person crew prospected the permit areas and mapped and sampled the Shore and Inland showings.

#### Shore Showing

This showing, reported by Thorsteinsson (1984), is described above. The sulphides are more than 90% pyrite and marcasite but contain up to 0.7% combined lead and zinc.

A second area consists of disseminated pyrite and marcasite 15 to 20 m above the Shore showing and 1 km north of the Galena showing.

#### Inland Showing

This showing comprises disseminated pyrite and marcasite in vuggy dolomites of the Disappointment Bay Formation, that lie a few metres above the unconformity with the underlying Cape Phillips Formation. The Inland Showing is 1500 m east

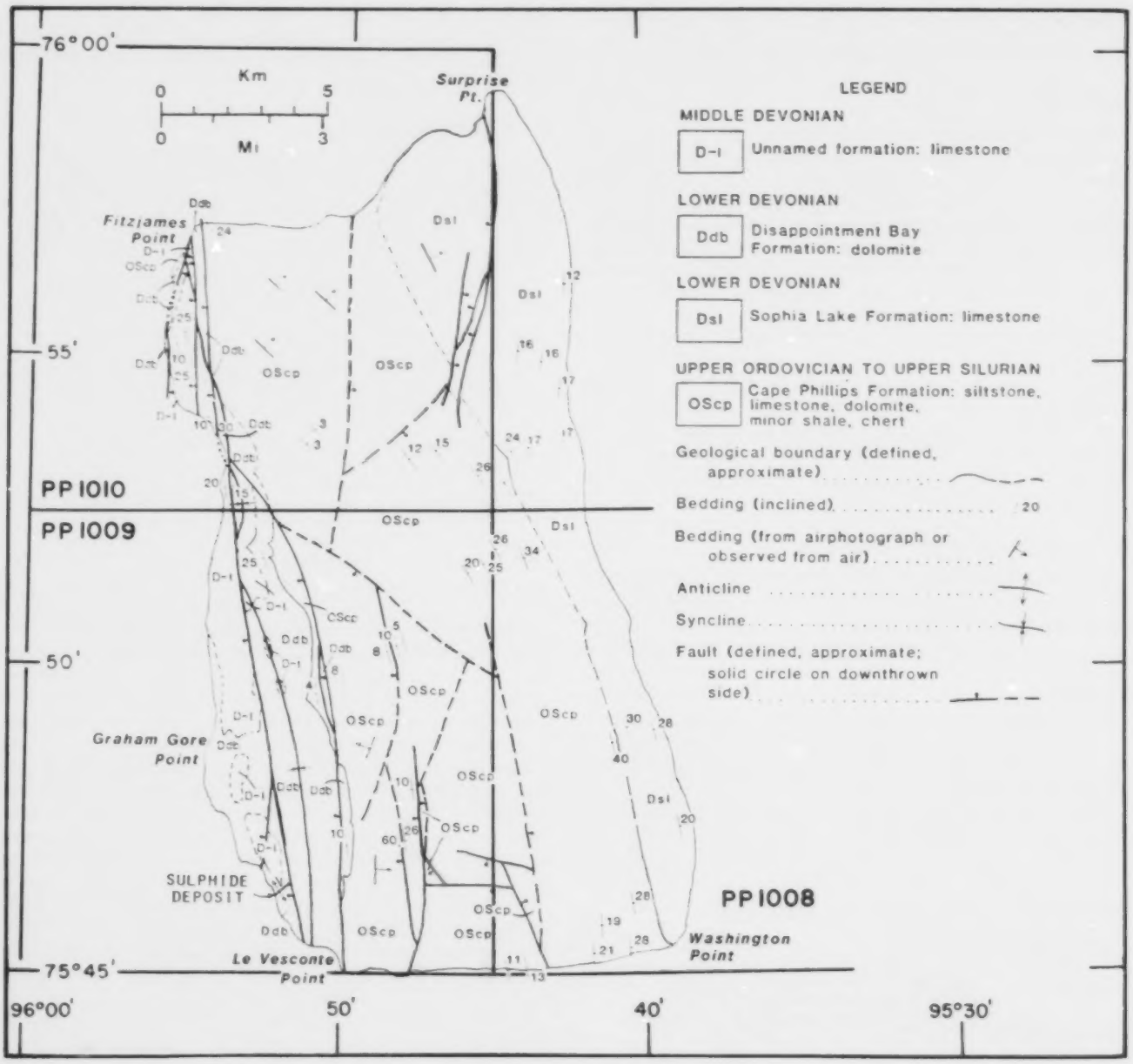



*FIGURE 4-8: Geological map of Baillie Hamilton Island (from Thorsteinsson, 1984).*

of the coast and appears to show similar stratigraphic and mineralogical features to those of the Shore showing. These showings are traceable for about 20 m along strike.

## BORDEN BASIN-BORDEN PENINSULA, BAFFIN ISLAND

Borden Peninsula, part of northern Baffin Island, is 500 km north of the Arctic Circle. The area of interest, containing the Society Cliffs Formation, is bounded by the Strathcona Sound and Adams Sound grabens and extends from Admiralty Inlet on the west beyond Milne Inlet in the east-southeast (Fig. 4-9).

Most of Borden Peninsula is underlain by Neohelikian shales, quartz arenites, greywackes, arkoses, conglomerates and carbonates (Table 4-7). The carbonates commonly contain stromatolites or bioherms or both. About 90 to 150 m of tholeiitic plateau basalts occur near the base of the sequence. Faulting occurred during deposition that took place in a southeasterly trending rift zone.

A complex assemblage of Aphebian-Archean gneisses is separated from the overlying Neohelikian strata by a nonconformity. A thin regolith is present in a few places on the gneisses, which are commonly stained red for several metres below the nonconformity (Jackson and others, 1978, p. 3).

Mississippi Valley-type zinc-lead deposits occur in the

Society Cliffs Formation at Nanisivik, Hawker Creek and elsewhere on Borden Peninsula. The Society Cliffs Formation is characterized by thick to massive beds of regularly laminated, brownish-grey to grey stromatolitic dololutite and dolosiltite. Planar stromatolites are ubiquitous; low domal varieties are common and cabbage-head types are less common (Jackson and others, 1978). Society Cliffs strata are shallow, subtidal to intertidal in origin. A strong, fetid, petroliferous odour is normally given off by freshly broken rock. Dolomite breccia is common and some of this brecciation can be related to early karsting (Olson, 1984; Geldsetzer, 1974a, b).

Hadrynian diabase intrudes all older rocks in the area and remnants of flat-lying Paleozoic sandstones and dolomite extend onto Borden Peninsula from adjacent parts of Baffin Island.

Papers by Jackson and Iannelli (1981) and Jackson, Iannelli and Tilley (1980) give a recent geological synthesis of the region.

**Mineral Exploration:**

Mineral exploration in the Borden Basin has been mainly for Mississippi Valley-type lead-zinc deposits in the Society Cliffs Formation dolomite (Nanisivik Mines Ltd.) and for shale-hosted lead-zinc deposits in the Arctic Bay and Victor Bay Formations (Petro-Canada Ltd.). Work was more or less restricted to the Nanisivik mine property (see Chapter 2) and the southeasterly-trending belt of Uluksan Group and upper Eqalulik Group sediments that bisect Borden Peninsula and the Borden Basin; this area extends from Strathcona Sound (Admiralty Inlet) in the northwest to Milne Inlet in the southeast (Fig. 4-9). It corresponds to the central North Baffin Rift Zone of Jackson and Ianelli (1981).

In 1981, Nanisivik Mines Ltd. began regional exploration of the area underlain by Society Cliffs Formation by contracting Aerodat Ltd. to fly 5,352 line km of helicopter-borne magnetic, electromagnetic and VLF-EM survey and Paterson, Grant and Watson Ltd. to compile and interpret this data. Some 150 EM and VLF-EM conductors were identified as probably of bedrock origin and 74 of these were recommended for further investigation (Gibbins, 1984). Nanisivik Mines Ltd. obtained 14 Prospecting Permits in February 1982 to protect areas of interest.

In 1983, a Petro-Canada Ltd. subsidiary, 103912 Canada Inc., obtained 12 Prospecting Permits (957-968) that mainly include areas underlain by Arctic Bay Formation shales. In 1985, they obtained three more permits (1044-1046) near Elwin Inlet (Fig. 4-10). Nanisivik Mines Ltd. relinquished 13 of 14 prospecting permits at the beginning of 1984 and Petro-Canada Ltd. relinquished 9 permits (957-965) at the beginning of 1985.

In 1982-83, Nanisivik Mines Ltd, did geochemical and geophysical surveys, geological mapping and prospecting in areas deemed to have favourable mineral potential (Gibbins 1985, p. 123-132). Some of these areas were drilled in 1984. In 1985, Nanisivik Mines Ltd. concentrated on geophysical surveys west and south of the mine area and geophysical

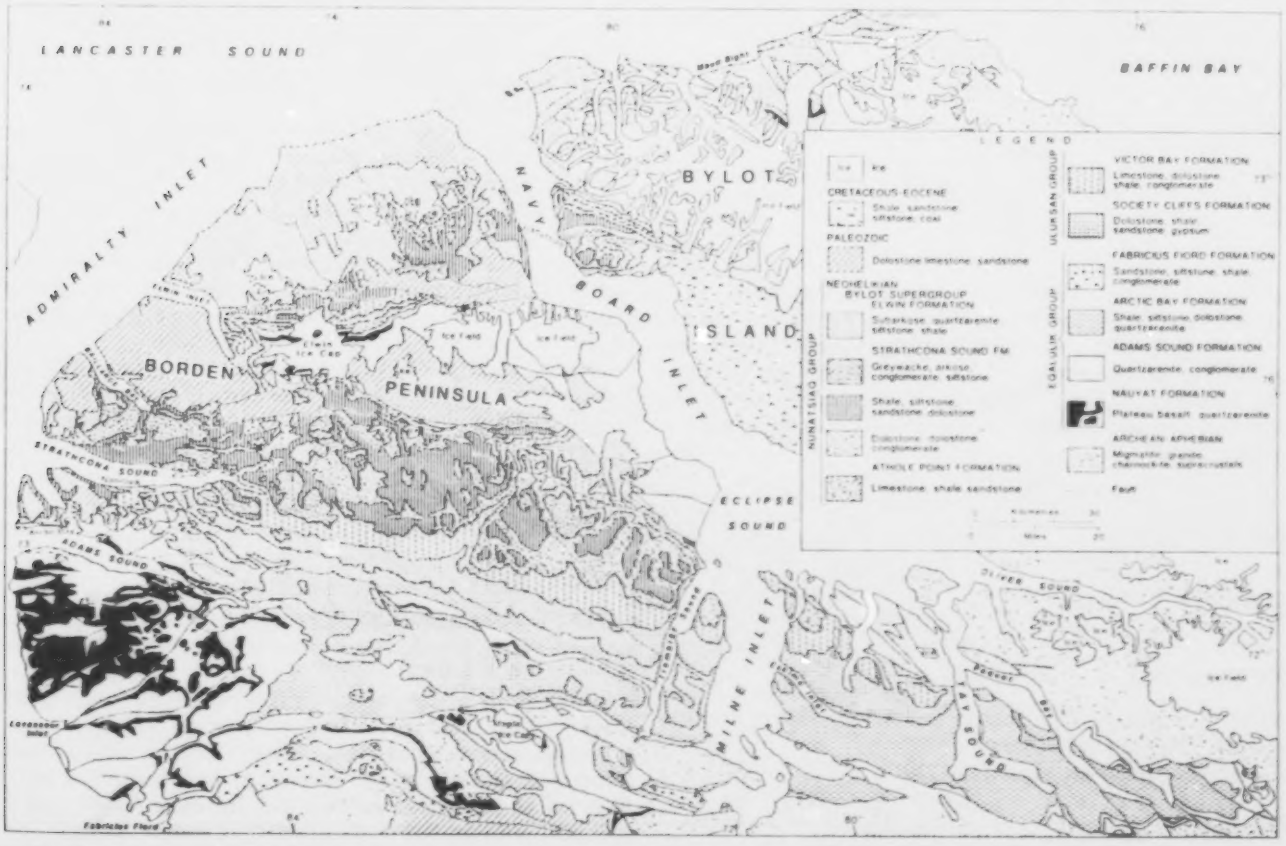



*FIGURE 4-9: Geology of the Borden Basin (from Jackson and Iannelli, 1981).*

***TABLE 4-7: TABLE OF FORMATIONS, BORDEN BASIN (from Jackson and Iannelli, 1981).***

| | | | |
|---|---|---|---|
| HADRYNIAN | | Franklin Intrusions: Diabase | |
| NEOHELIKIAN | GP | Intrusive Contact | |
| | KUNAJUAQ GROUP | Elwin Fm. (470-1220 m): | $EL_2$: Quartzarenite, siltstone<br>$EL_1$: Sandstone, siltstone, dolostone |
| | | Gradational | |
| | | Strathcona Sound Fm: (430-910 m+) | $SS_4$: $SS_{1-3}$ lithologies interbedded<br>$SS_3$: Polymictic conglomerate<br>$SS_4$: Siltstone, greywacke<br>$SS_3$: Arkose-greywacke, shale<br>$SS_2$: Dolostone, dolostone conglomerate<br>$SS_1$: Shale, siltstone |
| | | Gradational | |
| | | Athole Point Fm: (0-585 m) Limestone, sandstone, shale | |
| | | Gradational | Gradational to Unconformable |
| | ULUKSAN GROUP | Victor Bay Fm: (156-735 m) | $VB_2$: Limestone, dolostone, flat pebble conglomerate<br>$VB_1$: Shale, siltstone, sandstone, limestone |
| | | Conformable, Abrupt to Gradational | |
| | | Society Cliffs Fm: (263-856 m) | $SC_2$: Stromatolitic & massive dolostones |
| | | Chiefly Unconformable? | |
| | SUPERSEQUENCE I | Fabricius Fiord Fm: (400-2000 m+) | $SC_1$: Stromatolitic dolostone, shale, sandstone, gypsum |
| | | $FF_4$: Arkose, conglomerate, dolostone | Gradational to Unconformable |
| | | $FF_3$: Subarkose, conglomerate | Arctic Bay Fm: (180-770 m) |
| | | $FF_2$: Shale, quartzarenite | $AB_4$: Shale, dolostone<br>$AB_3$: Shale, siltstone |
| | | $FF_1$: Quartzarenite, shale | $AB_2$: Shale, quartzarenite<br>$AB_1$: Siltstone, quartzarenite |
| | | Conformable, Abrupt to Gradational | |
| | BYLOT GALLERY | Adams Sound Fm: (0-610 m) | |
| | | $AS_3$: Quartzarenite, conglomerate, shale | $AS_U$: Quartzarenite |
| | | $AS_2$: Quartzarenite | $AS_L$: Quartzarenite, conglomerate |
| | | $AS_1$: Quartzarenite, conglomerate | |
| | | Conformable | |
| | | Nauyat Fm: (0-430 m) | $NA_2$: Plateau basalt<br>$NA_1$: Quartzarenite, subarkose, basalt |
| | | Nonconformity | |
| ARCHEAN-APHEBIAN | | Gneissic basement complex: Migmatite, foliated granitic rocks, granite, charnockite, supracrustal relics | |

surveys and drilling in the mine area. Nanisivik Mines Ltd.'s exploration budget for 1982-1985 was more than $5 million.

In 1984, Petro-Canada Ltd. completed geochemical and geological reconnaissance of their permit areas in the Arctic Bay Formation shales. In 1985, they concentrated on mapping and testing a silver-galena-barite showing near the head of Elwin Inlet.

## BERT CLAIM

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Lead, Zinc
48 A/6
72°28'N, 82°45'W

### REFERENCES

Gibbins (1984, 1985); Jackson and Iannelli (1981); Laporte (1974a); Padgham and others (1976).

DIAND assessment report: 081710.

### PROPERTY

BERT.

### LOCATION

The claim is about 83 km southeast of Nanisivik (Fig. 4-10). A small airstrip at Magda Lake is 15 km to the southeast. However, it usually becomes muddy during spring runoff.

### HISTORY

The BERT claim was recorded on October 1, 1981, to protect mineral rights to an area that corresponds to a strong EM anomaly discovered during the 1981 reconnaissance airborne geophysical survey (Gibbins, 1984). Galena and lesser amounts of sphalerite were observed in float and overburden found on the claim.

Geologists working for King Resources Ltd. explored the Magda Lake region between 1970 and 1973 (Laporte, 1974a; Padgham and others, 1978), but apparently did not find the showing or EM conductor.

Geological mapping and prospecting in 1982 revealed sulphide minerals in several distinct areas. The most common showings are dyke or contact controlled. Massive galena and sphalerite are found in gossanous 'sandy' dolostone float of the basal part of the Society Cliffs Formation; assays in excess of 65% lead and zinc combined were obtained. Minor fracture fillings of yellowish sphalerite, galena, and smithsonite in the interbedded sandy and massive unit assayed up to 3.5% lead and zinc combined. Near the main dyke on the north grid, minor pyrite with sphalerite in 'cooked' dolostone float assayed up to 36% Zn. Hematite, after pyrite, has been observed throughout the Society Cliffs Formation sequence in varying amounts. In one area magnetite veins, a few centimetres wide, cut a 'bleached' dolostone at the contact with the northernmost gabbro dyke.

A geochemical soil survey outlined four zones of anomalous lead and zinc. The first appears to represent downslope transport of mineralized 'sandy' float from the Arctic Bay/Society Cliffs contact. The second zone appears to be related to more massive strata with Pb-Zn fracture fillings higher in the Society Cliffs Formation sequence. The third zone may also represent migration of mineralized float from the Arctic Bay/Society Cliffs contact, whereas the fourth zone appears to be dyke related.

Magnetic and VLF-EM surveys of the total grid area outlined gabbro dykes. The VLF Fraser filter contours outlined narrow zones believed to represent the Arctic Bay Formation/Society Cliffs Formation contact near the center of the claim (Gibbins, 1985).

Additional geological mapping, geochemistry and IP work on detailed grids were completed in 1983.

### DESCRIPTION

BERT is in the Borden Basin, an aulacogen-like structure that evolved within the North Borden Rift Zone (Jackson and Iannelli, 1981).

The majority of the claim area is underlain by fine-grained black fissile shales of the Arctic Bay Formation. These are locally overlain by dolostones of the Society Cliffs Formation. These formations are cut by two phases of fault-controlled dyke swarms; an older east-trending Borden dyke swarm and a younger northwest-trending Franklin dyke swarm (Jackson and Iannelli, 1981).

## CURRENT WORK AND RESULTS

In 1984, ten holes (452 m) were drilled on the claim. Four holes tested a dyke-related EM anomaly on the north grid, five holes tested a series of broad, medium-strength IP anomalies on the north and south grids, and the tenth hole was drilled in an area of galena bearing float on the south grid.

No galena was found in the drilling, only minor pyrite related to the diabase dykes. The dykes are believed to be the main cause of a copper anomaly and the strong EM response. This response is explained by metamorphosed shale near the dykes. The IP response was in response to limonite zones in sandy dolomite. Galena and sphalerite are rarely present and related to the Society Cliffs Formation - Arctic Bay Formation contact.

## PROSPECTING PERMITS 957-968

Petro-Canada Ltd.
P.O. Box 2844
Calgary, Alta., T2P 3E3

Lead, Zinc
48 A/5,11-13,B/16
72°15-45'N,
82°30'-84°30'W

## REFERENCES

Blackadar and others (1968a-d); Gibbins (1984, 1985); Jackson and Iannelli (1981); Laporte (1974a,b); Olson (1984); Sangster (1981).

DIAND assessment report: 081834.

## PROPERTY

Prospecting Permits 957-968.

## LOCATION

The permits are on Borden Peninsula, northern Baffin Island, between Arctic Bay and Milne Inlet (Fig. 4-10). They are

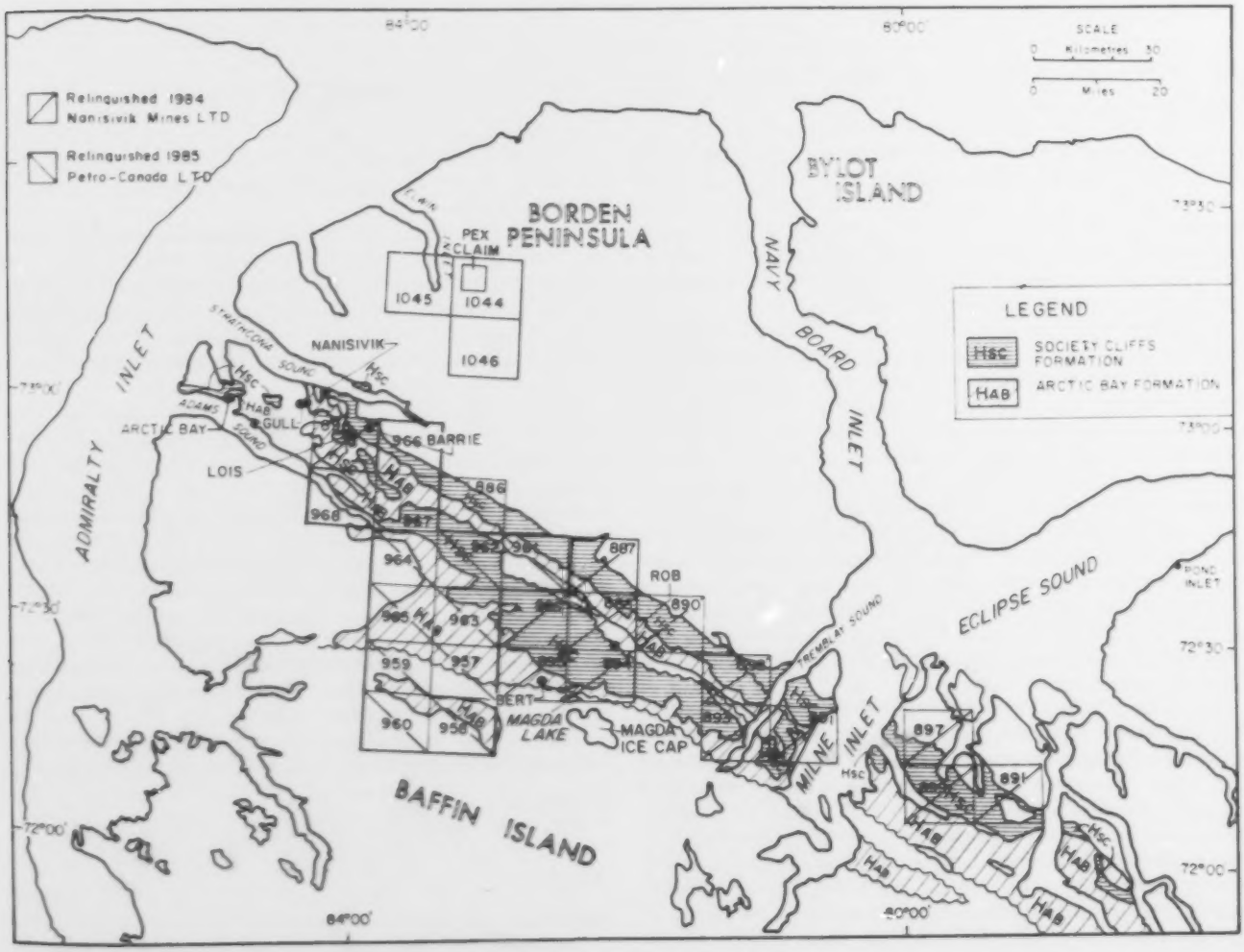



*FIGURE 4-10: Claims and permit areas Borden Peninsula, northern Baffin Island. See Figure 4-11 for claims south of Strathcona Sound.*

generally southeast of the head of Adams Sound between longitude 83° and 84° west.

## HISTORY

The Geological Survey of Canada mapped the area on a reconnaissance scale (1:253,440) in the sixties (Blackadar and others, 1968a-d). Mineral rights to NTS areas 48 A/11-13 and B/16 were previously held by King Resources Ltd. as Prospecting Permits 86-89 between 1969 and 1972 (Laporte, 1974a,b and Olson, 1984).

In 1981, Petro-Canada Ltd. prospected and did lithogeochemical prospecting and stream-sediment-sampling surveys in the area. The principle target was clastic and carbonate sediments of the Proterozoic Bylot Supergroup, with emphasis on assessing the metal and uranium content of black shales. No significant mineral occurrences were discovered, however, several sites of high lead and zinc content (6,000 ppm combined) were found in shales of the Arctic Bay Formation (Gibbins, 1984, p.84).

In August 1983, follow-up work, mainly prospecting and collection of heavy mineral samples, was done in areas of Arctic Bay Formation shales that contained significant rock geochemical anomalies in 1981 (Gibbins, 1985).

Prospecting Permits 957-968 were obtained in February 1983. Nine of these (957 to 965) were relinquished in February 1985.

## DESCRIPTION

Like most of the southern Borden Basin, the permits are underlain by dark argillaceous carbonate and shale units of the Arctic Bay Formation (Table 4-7). Locally, pyritic shale is the predominant lithology: siltstone and quartz arenite interbedded with shale form the lower part of the formation; and siltstone, dolostone and quartz arenite interbedded with shale form the upper part (Jackson and Iannelli, 1981).

The formation ranges from 500 to 770 m thick throughout most of the area. The lower contact with the Adams Sound Formation is conformable and gradational. Some shale beds contain concretions and cone-in-cone structures. White gypsum efflorescence and calcareous coatings are common on the shales and some strata emit a strong petroliferous odour.

Jackson and Iannelli (1981) distinguished four intergradational members of the Arctic Bay Formation in the area (Table 4-7). However, the entire formation is distinctly different southeast of Milne Inlet. Planar-laminated micaceous black-grey shale predominates in the $AB_3$ member, which is up to 400 m thick on Borden Peninsula. Jackson and Iannelli (1981, p. 279) interpreted the monotonous black shales of the $AB_3$ member as having accumulated in shallow to deep subtidal to basinal environments.

Sangster (1981) recommended the shales of the Borden Basin and particularly the Arctic Bay Formation shale as a prospective area for shale-hosted stratiform lead-zinc deposits on the basis of geology and by comparison with well-known deposits of this type. He pointed out several impressive, favourable indicators are present in the Borden Basin, namely syn-sedimentary faulting of the Arctic Bay Formation in the North Borden Rift Zone and the possibility of second-order basins the size of individual lead-zinc deposits. He also suggested that at least part of the Borden Basin may be a lead-zinc metallogenic province, as demonstrated by the lead- zinc deposits at Nanisivik.

*TABLE 4-8: LITHOGEOCHEMISTRY - BORDEN BASIN (values in ppm unless otherwise indicated)*

| | MEAN | STANDARD DEVIATION | POSSIBLY ANOMALOUS ($x+3S$) | DEFINITELY ANOMALOUS ($x+2S$) |
|---|---|---|---|---|
| **SHALE (47)** | | | | |
| Copper | 210 | 645 | 1500 | 2145 |
| Lead | 51 | 87 | 225 | 312 |
| Zinc | 188 | 383 | 954 | 1337 |
| Silver | 1.4 | 0.65 | 2.7 | 3.35 |
| Barite | 603 | 1536 | 3675 | 5211 |
| Iron % | 7.85 | 8.27 | 24.36 | 32.66 |
| **CARBONATE (24)** | | | | |
| Copper | 68 | 157 | 382 | 539 |
| Lead | 124 | 349 | 822 | 1171 |
| Zinc | 358 | 658 | 1674 | 2332 |
| Silver | 1.33 | 0.81 | 2.95 | 3.76 |
| Barite | 266 | 205 | 676 | 881 |
| Iron % | 5.44 | 8.38 | 22.2 | 30.58 |
| **SANDSTONE (53)** | | | | |
| Copper | 243 | 777 | 1847 | 2624 |
| Lead | 21 | 86 | 193 | 279 |
| Zinc | 71 | 298 | 667 | 965 |
| Silver | 0.73 | 1.00 | 2.73 | 3.73 |
| Barite | 345 | 522 | 1389 | 1911 |
| Iron % | 2.37 | 5.76 | 13.89 | 19.65 |

## CURRENT WORK AND RESULTS

### Geochemistry

1) Stream sediment samples: The 1981 survey showed that secondary dispersion of target elements is not effective on the Borden Peninsula.

2) Lithogeochemical samples: Lithogeochemical samples were collected during ground traverses in 1983 and 1984. The samples were crushed to -200 mesh and analyzed for copper, lead, zinc, iron, manganese, barium, gold and silver. Statistical parameters were calculated for each lithology (Table 4-8) and several anomalies were identified and examined (Tables 4-9 and 4-10).

Early in the 1983 field season, it was determined that anomalies in shale and siltstone areas were best explained by manganese adsorption of zinc and lead. Consequently, emphasis was shifted to other lithologies.

3) Heavy mineral samples: In 1983, 52 heavy mineral samples were collected from the active part of important stream courses draining the Arctic Bay Formation. The samples were sieved, dried, and separated with heavy liquids and an electromagnetic separator by C.F. Mineral Research Ltd. of Kelowna, B.C. Heavy paramagnetic (HP), heavy non-magnetic (HN) and intermediate paramagnetic (IP) fractions were analyzed for copper, lead, zinc and/or silver. The results were statistically treated (Table 4-11) and field checked.

Heavy non-magnetic mineral concentrates were microscopically examined for kimberlite indicator minerals.

### Geophysics

1) VLF-EM survey: A small grid was laid out over a zinc-rich zone in Prospecting Permit 967 in 1984. No conductor was detected.

### Results

During the 1983 field season, a rock sample (#602) was collected in the south central part of Prospecting Permit 967 (48 A/13 SW) that assayed 17% Zn. This area, 8 km east-northeast

**TABLE 4-9: LITHOCHEMICAL ANOMALIES, MILNE INLET, NTS 48 A**

| NO. | LOCATION | ELEMENT(S) | FORMATION | HOST ROCK | COMMENTS |
|---|---|---|---|---|---|
| 011 | ER483500/8088200 | Cu 2900 | AS | Quartz arenite | - traces of disseminated malachite: not significant |
| 406 | ER589300/8088600 | Cu 4300 | AS | Quartz arenite | - traces of disseminated microscopic chalcocite and malachite: not significant |
| 822 | ER591200/8078200 | Ba 870 | $NA_2$ | Stromatolitic limestone marker between basalt flows | - traces of chalcopyrite, 20 cm thick: insignificant |
| 823 | ER591200/8078200 | Cu 2030 | $NA_2$ | Stromatolitic limestone marker between basalt flows | - traces of chalcopyrite, 20 cm thick: insignificant |

** see figure 4-7 for formation names*

**TABLE 4-10: LITHOCHEMICAL ANOMALIES, MOFFAT INLET, NTS 48 B**

| SAMPLE NUMBER | LOCATION | ELEMENT(S) | FORMATION | HOST ROCK | COMMENTS |
|---|---|---|---|---|---|
| 50 | ML412800/8073300 | Pb 330<br>Zn 1040 | $AB_4$ | Dolomite | - minor disseminated galena: not significant |
| 508 | ML403300/8100800 | Pb 1680<br>ZN 53000<br>Ag 4.1 | SC | Brecciated Dolomite | - known occurrence of galena<br>- sphalerite |
| 602 | ML411200/8077300 | Zn 173000 | SC | Carbonate Breccia | - contains "iron oxides", no smithsonite recognized: may be significant |
| 605 | ML402400/8077300 | Cu 780 | SC | Rusty Dolomite | - Rusty Talus |
| 802 | ML410300/8073500 | Ba 18200 | $AB_4$ | Dolomite laminae in shale | - traces of galena observed: not significant |
| 805 | ML410300/8073500 | Pb 450 | $AB_4$ | Dolomite laminae in black shale | - traces of galena observed: not significant |
| 806 | ML410300/8073500 | Zn 2400<br>Ba 6200 | $AB_3$ | Pyritic dolomitic shale laminae | - only minor pyrite observed: not significant |
| 810 | ML403900/8075800 | Ag 3.2 | $AB_4$ | Laminated pyrite L3 shale | - 2.3 cm thick: not significant |
| 3803 | ML411200/8077300 | Zn 100800 | SC | Breciated Dolomite | - mineralized zone 2 to 5 m wide extending for about 200 m along strike |
| 3804 | ML411200/8077300 | Zn 135000 | SC | Breciated Dolomite | |

** see Figure 4-7 for formation names.*

of the head of Adams Sound, was re-visited and prospected in 1984. Orange-brown, iron-stained breccia was easily distinguished from barren grey dolomite. The showing consists of a rusty weathered zone in felsenmeer of Society Cliffs Formation and varies from 2 to 5 m in width and extends for about 200 m along strike. Although the zinc grade is of economic interest, zinc minerals could not be identified in hand specimen and the showing is considered to be too discontinuous to have economic importance.

Several new showings of copper were found near the head of Adams Sound in the Adams Sound, Nauyat and Strathcona Sound Formations (Table 4-7). Sparse chalcocite, chalcopyrite, pyrite and magnetite occur as discrete grains in Adams Sound Formation arenite. Disseminated chalcopyrite also occurs sparingly in the Nauyat Formation on the south side of Adams Sound, 10 km north of Mt. Podolsky. The chalcopyrite is restricted to a 1.5 m thick stromatolitic limestone layer found between two basalt flows near the top of the formation.

The heavy mineral sampling program outlined several anomalous sites (Table 4-12). Samples with multi-element and

**TABLE 4-11: HEAVY MINERAL GEOCHEMISTRY BORDEN BASIN**

| ELEMENT | FRACTION | POPULATION | MEAN (ppm) | STANDARD DEVIATION (ppm) | THRESHOLD ($x+2S$) (ppm) | DEFINITELY ANOMALOUS (ppm) |
|---|---|---|---|---|---|---|
| Copper | -20 HN[1] | 52 | 715 | 2035 | 2750 | 4800 |
| | -20 HP[2] | 52 | 105 | 85 | 190 | 275 |
| Lead | -20 HN | 52 | 35 | 55 | 90 | 150 |
| | -20 HP | 52 | 80 | 80 | 160 | 260 |
| Zinc | -20 HN | 52 | 1900 | 5800 | 7500 | 13000 |
| | -20 HP | 52 | 285 | 385 | 650 | 1000 |
| | -20 IP[3] | 52 | 285 | 95 | 380 | 480 |
| Silver | -20 HN | 52 | 0.1 | 0.1 | 0.2 | 0.3 |
| | -20 HP | 52 | 0.2 | 0.15 | 0.4 | 0.5 |

[1]: *-20 HN = -20 mesh heavy non-magnetic fraction*
[2]: *-20 HP = -20 mesh heavy paramagnetic fraction*
[3]: *-20 IP = -20 mesh intermediate gravity paramagnetic fraction*

*TABLE 4-12: HEAVY MINERAL ANOMALIES, BORDEN BASIN*

| | | | Location |
|---|---|---|---|
| **A-Rated Anomalies** | | | |
| 348* | -20 HP<br>-20 IP | Pb 469, Zn 2850 +<br>Zn 602 | NTS 48 A<br>ML424500/8079800 |
| 380 | -20 HN<br>-20 HN | Cu 5200, Zn 15500<br>Cu 351 | NTS 48 B<br>ER583900/8086500 |
| **B-Rated Anomalies** | | | |
| 342 | -20 HP | Cu 365, Ag 0.7<br>(Pb 213**) | NTS 48 A<br>ML405100/8083200 |
| 378 | -20 HN | Cu 13600,<br>Zn 36000 | NTS 48 A<br>ML403200/8082600 |
| **C-Rated Anomalies** | | | |
| 345 | -20 HN | Ag 0.3, (Pb 99) | NTS 48 A<br>ML415800/8082700 |
| 351 | -20 HP | Cu 353, (Ag 0.4) | NTS 48 A<br>ML405000/8074500 |
| **D-Rated Anomalies** | | | |
| 281 | -20 HN | Pb 340 | NTS 48 A<br>ML425000/8023000 |
| | -20 HP | Pb 250 | |

* *Sample number.*
\+ *Listed here is the fraction, element, and concentration (in ppm).*
** *Possibly anomalous value are in brackets.*

multi-size fraction anomalies are likely to be the most important. Residual heavy minerals included a number of ilmenite grains, but other kimberlite indicator minerals like pyrope and chrome diopside were rare or of dubious identity.

## PROSPECTING PERMIT 886

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Zinc, Lead
48 A/13 SE
72°52'N, 83°15'W

### REFERENCES

Gibbins (1983a, 1984, 1985); Jackson and others (1978, 1980); Jackson and Iannelli (1981); Laporte (1974a); Olson (1984).

DIAND assessment report: 081722 (1983 work).

### PROPERTY

Prospecting Permit 886.

### LOCATION

Prospecting Permit 886 is centered 48 km east-southeast of the Nanisivik mine. The Adams River flows northwesterly through the permit area from its southeast corner. There is a small airstrip near the center of the permit area on the northeast side of the Adams River (Fig. 4-10).

The Hawker Creek pyrite-sphalerite-galena showings (Gibbins, 1983a, p.28-30) are centered near the northwest corner of Permit 886.

### HISTORY

The area has been explored for Nanisivik-type ore deposits since 1963 (Laporte, 1974a). Most of this work was done for King Resources Ltd. and its successor, Global Arctic Islands Ltd. by Trigg Woollett Consulting Ltd. Olson (1984) discussed the results of exploration in the Hawker Creek, Adams River and Surprise Creek areas, which fall in or adjacent to the permit area.

Prospecting Permit 886 is one of the fourteen permits obtained by Nanisivik Mines Ltd. in February, 1982, to protect outcrop areas of Society Cliffs Formation and anomalies outlined by the 1981 Aerodat Ltd. reconnaissance airborne geophysical survey (Gibbins, 1984, p.86).

A number of airborne geophysical anomalies were ground checked in 1982. Grids were established over areas of interest and were subsequently prospected, geologically mapped, geophysically tested (VLF-EM and magnetic) and geochemically sampled (copper, lead and zinc analyses of soil samples).

In July 1983, an IP chargeability/resistivity survey was conducted over the central part of the permit. A couple of areas with coincident IP, EM and zinc anomalies were recommended for drilling.

A grid set up over an airborne-detected geophysical anomaly (2-B2-11), near the center of the southeast quarter of Permit 886, was mapped and sampled. Massive, brecciated dolomites of the Society Cliffs Formation have been intruded by a northwesterly trending gabbro dyke just south of the baseline. A steel-blue altered zone, produced by the intrusion, is present along the dyke margin in much of the area. Four gossan zones were discovered, including one in the altered zone. Geochemical results included spot highs, but were generally low for copper, lead and zinc, even in the gossan zones. No economic base-metal sulphides were found within the gossans, however, two showings of galena and sphalerite were found in association with secondary dolomite as fracture fillings (Gibbins, 1985).

### DESCRIPTION

The permit is in the central part of the Central Borden Rift Zone of the Borden Basin (Jackson and others, 1978, 1980; Jackson and Iannelli, 1981). This rift zone contains most of the outcrop of Society Cliffs Formation dolomite, which is the host rock of the ore at the Nanisivik Mine.

Several airborne-detected geophysical anomalies (EM conductors) are near the center of Prospecting Permit 886 (2-B2-2,4,5,5A and 7) and one is near the center of the southeast quarter (2-B2-II).

The northeast half and southeast corner of Prospecting Permit 886 is underlain by northwesterly trending belts of Society Cliffs Formation dolomite (Figures 4-9 and 4-10). These belts form topographic highs that are separated by the valley of the Adams River, which is underlain by Arctic Bay Formation shales and extends from the southeast corner to the mid-point of the western boundary of Prospecting Permit 886.

### CURRENT WORK AND RESULTS

In 1984, the central grid was extended southward and more IP, VLF-EM and magnetic surveys were completed.

Five drill holes (203 m) tested dyke related IP anomalies in Arctic Bay Formation shale. Only minor amounts of pyrite and graphite were found.

## LOIS CLAIM

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Gold, Copper
48 B/16
72°55'N, 84°08'W

### REFERENCES

Blackadar and others (1968d); Gibbins (1984, 1985); Jackson and Iannelli (1981).

DIAND assessment report 081695 (1983 work).

### PROPERTY

LOIS.

### LOCATION

The claim is 20 km southeast of Nanisivik (Fig. 4-10).

### HISTORY

An airborne geophysical survey, done for Nanisivik Mines Ltd., identified a strong conductive anomaly adjacent to a gabbro dyke. Dyke related anomalies are common in the region and it was decided to study one of these anomalies in detail. Consequently, LOIS was recorded in October 1981.

In 1982, the area was covered with reconnaissance geological, geochemical and geophysical surveys. The latter included maxmin EM, VLF-EM, magnetometer and IP work. Quartz-carbonate chalcopyrite veinlets in float assayed up to 7.0 g/t (0.20 oz/ton) Au and 5.7% Cu in float (Gibbins, 1985, p. 130).

### DESCRIPTION

The area is in a portion of the Borden Basin that evolved within the North Baffin Rift Zone (Jackson and Iannelli, 1981). Strata in the area of the claim, mainly fine-grained black fissile shales of the Arctic Bay Formation, are overlain by algal laminated and massive dolostones of the Society Cliffs Formation (Blackadar and others, 1968d). All these formations are cut by two phases of fault-controlled dykes, an older east-trending Borden dyke swarm and a younger northwest-trending Franklin dyke swarm.

### CURRENT WORK AND RESULTS

In 1984, two holes (198 m) tested two very strong EM anomalies on the north flank of an east-trending gabbro dyke. Both holes intersected altered shales near the dyke contact. The first hole contained a 0.5 m of chalcopyrite-pyrite-bearing zone that assayed 0.44% Cu and 0.27% Zn, but no gold.

## BN CLAIM

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Lead, Zinc
48 B/16,C/1
73°N, 84°02'30'W

### REFERENCES

Blackadar and others (1968c and 1968d).

### PROPERTY

BN.

### LOCATION

The claim is centered on the northeast side of Barrie Creek, 15 km east-southeast of the Nanisivik townsite or 10 km east-southeast of the south end of Kuhulu Lake.

### HISTORY

In 1983, a small area, just outside an area covered by a 1981 Aerodat airborne geophysical program, was geologically mapped and geochemically surveyed. BN was recorded in September 1985.

### DESCRIPTION

The area is underlain by dolostones of the Society Cliffs Formation and shales of the Victor Bay Formation (Blackadar and others, 1968c and 1968d).

### CURRENT WORK AND RESULTS

In 1985, a grid was established and VLF-EM, GEM-8 and soil geochemical surveys were completed. The GEM-8 survey identified one deep anomaly. However, this was not confirmed by VLF work. Geochemical results were not available when this summary was written (March, 1986).

## NANISIVIK WEST PROJECT

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Zinc, Lead
48 C/1
73°00-05'N, 84-85°W

### REFERENCES

Blackadar and others (1968c); Geldsetzer (1973a, 1973b); Gibbins (1984, 1985); Gibbins and others (1977); Jackson and others (1978); Lemon and Blackadar (1963).

DIAND assessment reports: 081537; 081692.

### PROPERTY

GULL, DEB, EMU, KANGA, ROO Original block
TGS, MRI, SMS, West block
KO, ALA North block

### LOCATION

The claims adjoin the Nanisivik mine property. They extend westerly from a point 2 km southwest of the Nanisivik townsite to 15 km southwest of the town, about half way to the community of Arctic Bay (Fig. 4-11). The area is bordered on the north by Strathcona Sound and on the south by the Arctic Bay road.

### HISTORY

The GULL claims were staked in 1972 to protect possible westward extensions of the Nanisivik deposit. Geological and VLF-EM surveys were done on the claims in 1974 (Gibbins and others, 1977). In 1976, a McPhar SS-15 system (vertical loop EM) detected several weak, unexplained anomalies.

In 1981, a geophysical survey of the area comprising magnetic, coplanar and coaxial EM and two channels of VLF-EM, was flown at 400 m line spacings with the EM boom at a height of 30 m (Gibbins, 1984). DEB was staked in 1982 to cover an airborne-detected anomaly (6-A2-4) outlined by the geophysical survey, south of the GULL claims.

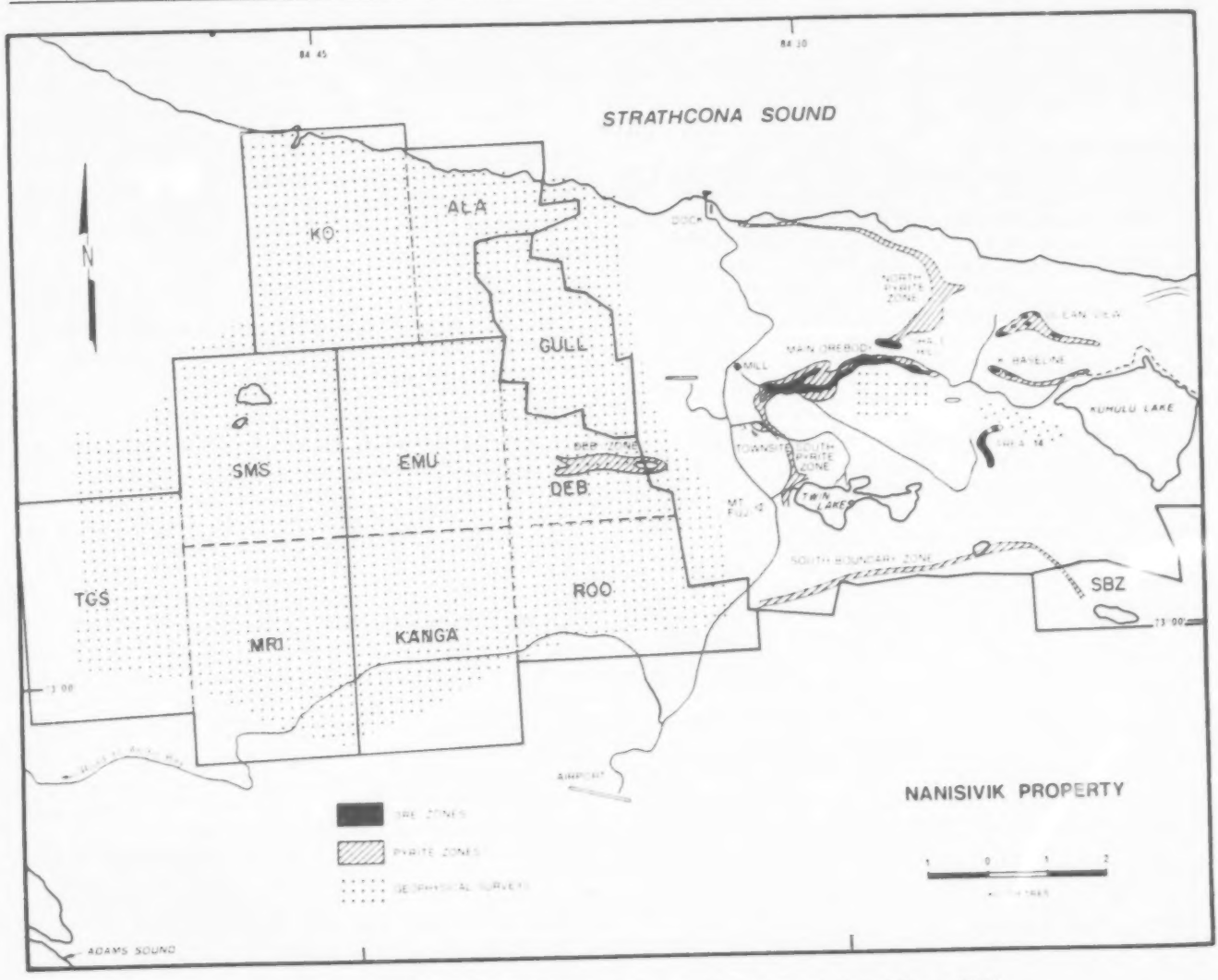



*FIGURE 4-11: Sulphide zones and mineral claims Nanisivik, NWT (modified from Nanisivik Mines Ltd. Annual Report 1985).*

In 1982, VLF-EM, Max-Min EM, IP and magnetometer surveys on DEB and the southeast corner of the GULL claims were designed to check for possible extensions of a good conductor on the RAVEN claims just east of the GULL claims. The results were consistent with shallow conductive overburden. The magnetometer survey did not indicate any magnetic bodies (i.e. gabbro dykes).

Exploration on the nearby RAVEN claims led to discovery of dolostone of the Society Cliffs Formation in the southeast corner of the GULL claim group. This indicated that the southern part of the group probably has only a thin cover of shale and glacial drift and may be considered for exploration for massive sulphides within the Society Cliffs Formation.

Because of the favourable location and geology, Turam and IP surveys of DEB and the adjacent RAVEN claims were extended into the GULL claims in 1983, despite the fact that previous geophysical surveys (VLF and vertical loop EM) did not yield indications of conductive sulphide minerals (Gibbins, 1985). The Turam EM Survey outlined two strong conductors extending up to 1500 m in an easterly direction at an interpreted depth of 100 m.

The geology of the GULL-DEB-RAVEN area was mapped in September 1983 by R. von Guttenburg of Metallgesellschaft Canada Ltd.

The remaining claims were staked during the summer of 1984. The GULL claims were permitted to lapse in November 1985 and were restaked in January 1986.

## DESCRIPTION

The region is underlain by a sequence of Helikian sediments that are generally flat lying but commonly block faulted. The most recent regional geological maps are those of Blackadar and others (1968c) and Lemon and Blackadar (1963). However, the Geological Survey of Canada has done additional mapping in the area since 1977 (Jackson and others, 1978).

The GULL claims are underlain by dolomitic shales of the lower Victor Bay Formation and dolomite of the middle Victor Bay Formation. Society Cliffs Formation dolomite, which

normally underlies the Victor Bay Formation and hosts the lead-zinc deposit at Nanisivik (Gibbins and others, 1977), outcrops only in the southwest corner of the claims. Earlier geological mapping and drilling to the east of the claims suggested it is present at a depth greater than 120 m. Almost 450 m of Society Cliffs Formation has been measured in the region, thus it was expected to occur on the claims at depths between 120 and 670 m. However, it is now known to be closer to surface, even though extensive pre-Victor Bay karsting in the area (Geldsetzer, 1973a, 1973b) may have removed some of the Society Cliffs Formation.

Northwest-trending diabase-gabbro dykes intrude the Victor Bay and Strathcona Sound Formations in adjacent areas.

### CURRENT WORK AND RESULTS

The McPhar GEM 8 system was chosen for reconnaissance geophysical surveys because it provides the deep penetration needed to identify massive sulphides like the DEB Zone. Interesting areas are then tested up with closer spaced VLF-EM, magnetometer and GEM 8 broadside surveys. In 1984, geophysical work consisted of reconnaissance and follow-up of the original block (DEB, EMU, KANGA and ROO claims), and reconnaissance of the western block (TGS, SMS and MRI claims).

Early in 1984 (May and April), 18 holes (2882 m) outlined two east-trending lenses of massive pyrite at the Victor Bay Formation - Society Cliffs Formation contact. These lenses are known as the DEB Zone (Figure 4-11). Two of these holes tested a 1983 IP anomaly just east of the DEB Zone but no sulphides were found at the contact.

Late in 1984, 15 holes (2650 m) were drilled in 6 areas to test 10 anomalies. Karst-related oxidation, limonite staining, dissolution and resedimentation were encountered in every area. Hematite mud in enlarged fractures and karst tubes probably accounts for most of the geophysical anomalies. Area 1 is south of Mount Fuji (LION 14 claim, Mineral lease 2810). Here, the conductor is coincident with a fault that is down dropped at least 100 m on the west side. Specks and blebs of sphalerite were found in one hole. Anomalous areas 2 (ROO claim) and 3 (DEB claim) appear to be due to pyrite veinlets in Society Cliffs Formation dolostones. In Area 5 (EMU claim), the anomaly is caused by pervasive oxidation of collapsed dolostone shown by red hematite alteration and staining on fractures and clay zones. Areas 4 and 6 (MRI claim) appear to represent a westward extension of the South Boundary Zone, but unfortunately, the drills did not get through the overburden.

In 1985, the sequence was: follow-up on the western block, follow-up on the DEB claims, reconnaissance of the north block (KO and ALA claims) and follow-up of the north block.

Only one hole was drilled on these claims in 1985 as most of the 1985 drilling was done on targets in the immediate vicinity of the mine (Chapter 2). The single hole tested a geophysical anomaly on the GULL claims.

## SBZ CLAIM-SOUTH BOUNDARY ZONE-EAST

Nanisivik Mines Ltd.
12th Floor, 20 Toronto St.
Toronto, Ont., M5C 2B8

Lead, Zinc
48 C/1
73°01'N, 84°20'W

### REFERENCES

Clayton and Thorpe (1982).

### PROPERTY

SBZ.

### LOCATION

The claim is centered on a small lake, 2.5 km south of the south end of Kuhulu Lake and 6 km east-southeast of the Nanisivik townsite (Figure 4-11).

### HISTORY

In 1981, the Aerodat survey identified two geophysical anomalies in the area (3-A2-30A and 3-A2- 31). In 1982-83, turam, VLF-EM, soil geochemistry and geological mapping were done in the claim area.

### DESCRIPTION

The area includes the eastern extension of the South Boundary Zone where it bends to an east-southeasterly trend (Fig. 4-11). A topographic ridge and a gabbro dyke extend into the area from the area 14 deposit.

Two northwesterly trending faults form the north and south shore of the small lake near the centre of the claim. The South Boundary Zone is a massive to disseminated pyrite zone related to a major east-west fault south of Nanisivik (Clayton and Thorpe, 1982).

### CURRENT WORK AND RESULTS

In 1984, two holes were drilled on the claim and SBZ was staked.

## PROSPECTING PERMITS 1044-1046 AND PEX CLAIMS

Petro-Canada Ltd.
P.O. Box 2844
Calgary, Alta., T2P 3E3

Silver, Barite
48 D/5,4
73°25N, 83°25'W

### REFERENCES

Blackadar and others (1968b); Jackson and Ianelli (1981).
DIAND assessment report: 082057.

### PROPERTY

Prospecting Permits 1044-1046; PEX 1-7.

### LOCATION

The area is 40 to 85km northeast of Nanisivik.The permits and claims include the area south and east of the head of Elwin Inlet (Fig. 4-10). Permit 1044 includes the west half of the Elwin Ice Cap.

### HISTORY

In 1983, Petro-Canada Ltd. geologists prospected northern Borden Peninsula in an effort to relate ore-genesis models to local geology. They decided that red bed copper in the basal

Strathcona Sound Formation and epigenetic silver in structural traps in the upper Adams Sound Formation offered the best targets. Several Ag-Pb-$BaSO_4$ anomalies were discovered as a result of the 1983 lithogeochemistry reconnaissance. In July 1984 the PEX claims were staked and in February 1984 Prospecting Permits 1044 to 1046 were granted to protect the showings.

## DESCRIPTION

The area of interest is underlain mainly by a variety of Neohelikian sedimentary units of the Bylot Supergroup. Granitic basement of Aphebian age, mafic volcanics of the Nauyat Formation (Basal Bylot Supergroup) and late Helikian gabbro-diabase dykes comprise the remaining bedrock (Table 4-7, Fig. 4-12, Blackadar and others, 1986b and Jackson and Iannelli, 1981). Drift, glacial ice caps and small lakes are common in the area.

Structure of the Borden Basin is related to a complex system of faulting. This system includes several periods and directions of rift-related faulting including major structures such as the Central Borden Fault Zone. In the Elwin Inlet area, west-northwest and east-northeast faults predominate (Fig. 4-12). One north-trending fault parallels much of the boundary between Prospecting Permits 1045 on the east and 1044 to the east. Several late diabase dykes trend north-northeast. The sediments are mainly horizontal or form shallow dipping fold limbs.

Silver, lead and barium minerals have hydrothermally replaced quartz arenites of the Adams Sound Formation in favourable zones along major faults. Samples assayed up to 330 ppm Ag, 0.06 to 7.6% Pb, 9 ppm to 14.5% Zn, up to 0.1% Cu and 0.11 to 22.0% Ba. However, these fault zones are only 10 to 25 cm wide. Silver is associated with both galena and pyrite mineralization. However, intense silicification of the Adams Sound Formation quartz arenites is believed to have restricted the extent to which hydrothermal replacement can occur.

## CURRENT WORK AND RESULTS

In 1984, two to three geologists and assistants established 70 km of grid in the area of main interest (southwest PEX claims). Evaluation work included 1:5,000 scale geological mapping, magnetic and VLF-EM surveys, and a soil geochemistry

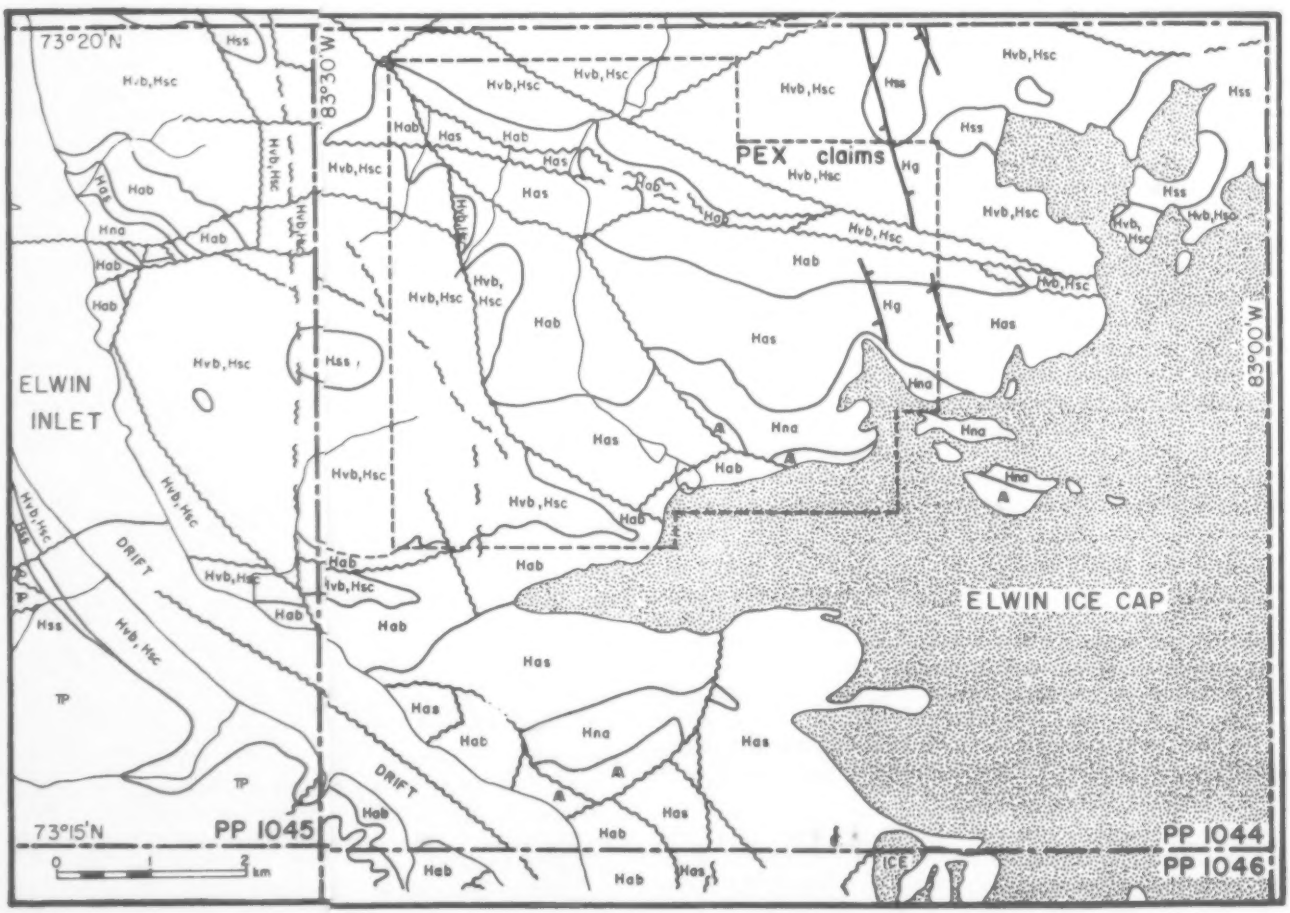
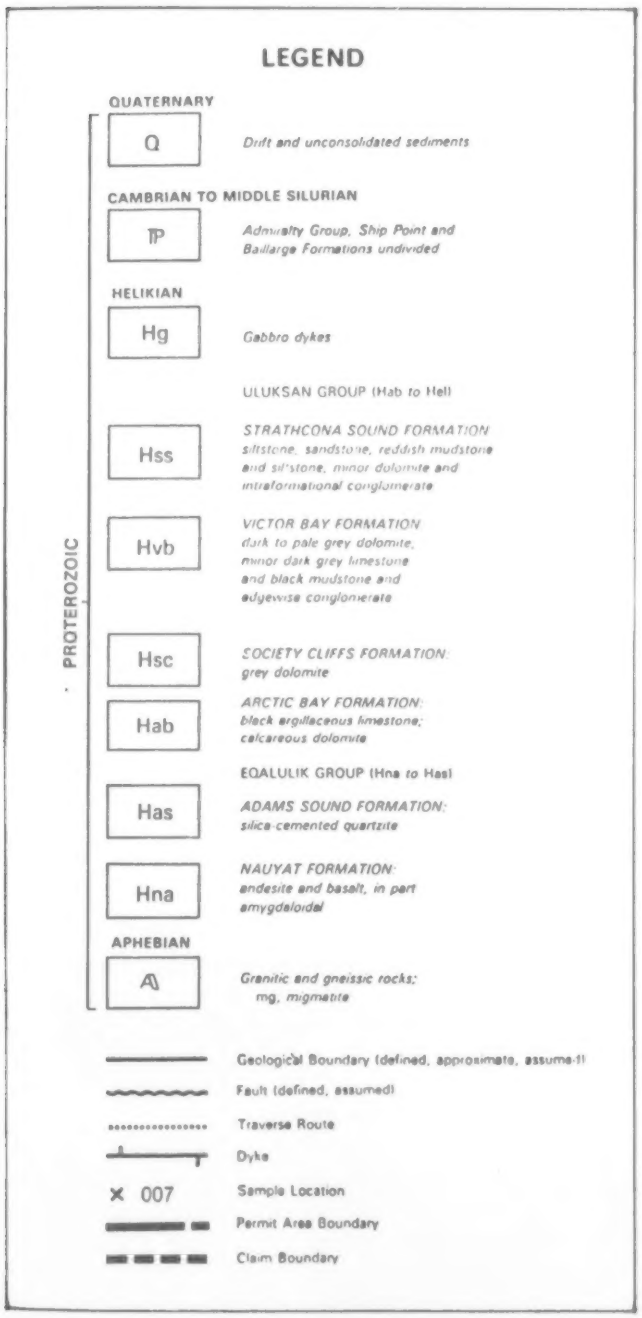



*FIGURE 4-12: Geology of the PEX claims (modified from Blackadar and others, 1968b; and Jackson and Iannelli, 1981).*

survey of the gridded area. Trenching and channel sampling across fault zones were also attempted.

The 1984 grid was reconditioned and geological mapping and geochemical sampling of the grid were completed and extended. A Turam-loop EM survey was done by Patterson, Grant and Watson Ltd. The depth to the conductor was calculated and used to guide diamond drilling. Eight holes (271 m) were drilled in the four main EM conductors. They are mainly narrow (10 to 25 cm) silver-bearing pyrite zones in a fault gouge.

Reconnaissance mapping and prospecting were completed south and west of the PEX claims and in the vicinity of Elwin Inlet. This work was directed to areas of Arctic Bay Formation shale in fault contact with Adams Sound Formation quartz arenites. A number of new mineral showings and gossans were noted and tested. However, none were considered to be of economic interest.




## MELVILLE PENINSULA

Mapping by Haywood (1967 and 1974) and others (Henderson, 1983; Schau, 1984) show that most of Melville Peninsula is underlain by Archean gneisses, migmatites and foliated to massive granitoid rocks. Among the oldest rocks of the region are folded and metamorphosed sedimentary and volcanic rocks of the Prince Albert Group (Table 4-13). These supracrustal rocks are distributed in two major northeast-trending belts up to 20 km wide and at least 280 km along strike (Fig. 4-13). Clastic metasedimentary rocks mainly derived from greywacke and interbedded with acid to basic metavolcanic rocks with local komatiite or ultrabasics and iron formation, are present mainly in the central part of Melville Peninsula.

A younger, Aphebian or Early Proterozoic sequence of supracrustal rocks, comprising the Penrhyn Group, forms northeast trending bands separated by belts of Archean gneiss and is widely distributed in the southern third of Melville Peninsula (Fig. 4-13). The group is a lithologically varied sequence of pelitic and psammitic gneiss, calcium silicate gneiss, marble, quartzite, and amphibolite (Table 4-13). The Penrhyn Group is complexly folded. Textures and mineral assemblages indicate that Penrhyn Group paragneiss was subject to upper amphibolite grade regional metamorphism after the last penetrative deformation (Henderson, 1983 p. 10).

Along the west coast of Melville Peninsula, near Mackar Inlet, an 800 m thick sequence of weakly metamorphosed arkose and minor phyllite, conglomerate and marble rests unconformably on a metamorphosed regolith developed on Archean basement. Frisch (1982) named this sequence the Folster Lake Formation. Maurice (1979) investigated anomalously high uranium in lake sediment and water samples in this area, found that the granitic rocks are enriched in uranium, particularly near the unconformity and concluded that this unconformity represents an attractive target for uranium exploration.

Much of southern Melville Peninsula was covered by a National Geochemical Reconnaissance survey of lake sediments and waters (Geological Survey of Canada, 1978a, 1978b, 1981b) and an airborne radiometric survey under the aegis of the Uranium Reconnaissance Program (Geological Survey of Canada, 1979). Follow-up work by Cameron (1979) identified strong and coincident zinc and nickel anomalies related to sulphidic-graphitic paragneiss of the Penrhyn Group. Maurice (1979) noted that the lake sediment results show high uranium contents for southern Baffin Island and particularly so for areas underlain by Penrhyn Group rocks.

Iron formation of the Prince Albert Group is widespread, thick and extensive (Shau, 1984) and can be readily traced on aeromagnetic maps. It consists mainly of magnetite and quartz with minor pyrite, hematite and carbonate. Some sections average as much as 30% iron. Rusty-weathering zones or gossans, commonly containing disseminated sulphides, are present in many parts of the region. Most are associated with the metavolcanic rocks of the Prince Albert Group.

The iron formation was systematically explored and staked

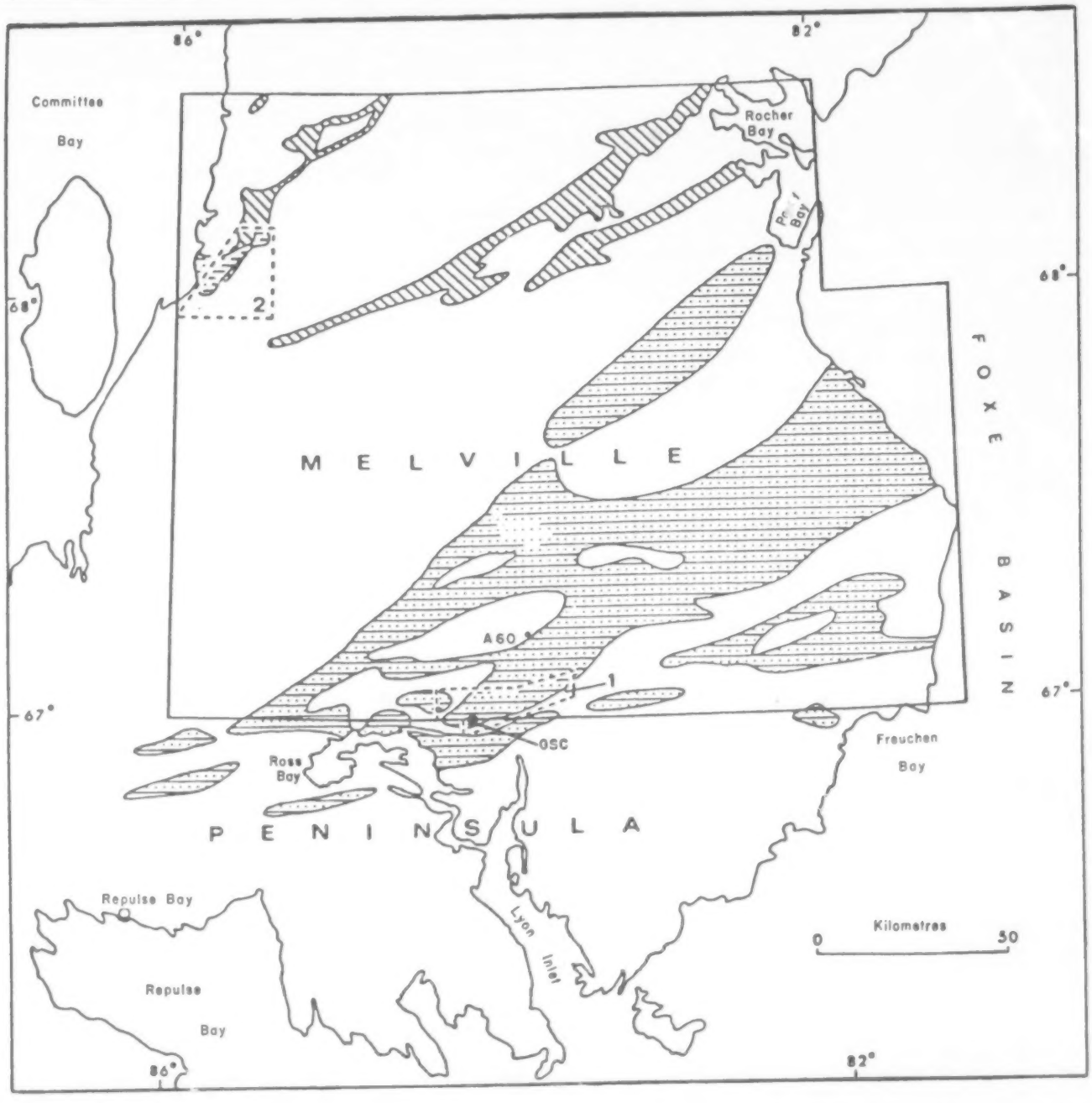



*FIGURE 4-13: Regional geology of southern Melville Peninsula showing permit and claim areas of Borealis Exploration Ltd. (from Maurice, 1979).*

***TABLE 4-13: TABLE OF FORMATION, MELVILLE BASIN (from Henderson, 1983).***

| AGE | ROCK UNIT | MAP UNIT * | ROCK TYPE |
|---|---|---|---|
| ORDOVICIAN | Bad Cache Rapids Formation | OB | Thinly bedded limestone |
| | Angular unconformity | | |
| NEOHELIKIAN OR HADRYNIAN | Mackenzie or Franklin Intrusions | NHd | Diabase dykes |
| | Intrusive contact | | |
| APHEBIAN | Granite | Ag | Massive aplitic to pegmatitic granitic dykes, sills, and plutons |
| | Intrusive contact | | |
| | Ultrabasic rocks | Aub | Hornblende peridotite, pyroxenite, metagabbro |
| | Intrusive contact | | |
| | Penrhyn Group | APqb | Quartzofeldspathic psammitic gneiss |
| | | APn | Pelitic gneiss |
| | | APnc | Massive calcium-silicate gneiss |
| | | APcs | Laminated calcium-silicate gneiss and marble |
| | | APc | Marble |
| | | APm | Massive amphibolite |
| | | APq | Massive quartzite |
| | Angular unconformity | | |
| ARCHEAN OR APHEBIAN | | AAm | Amphibolite dykes |
| | Intrusive contact | | |
| ARCHEAN | Granitoid gneisses | Aqdn | Quartz diorite augen gneiss |
| | | Aqmn | Quartz monzonite augen gneiss |
| | | Agdn | Layered granite to granodiorite gneiss |
| | Intrusive contact | | |
| | Prince Albert Group | AAif | Oxide, silicate, and sulphide iron formation |
| | | AAln | Leucocratic quartzofeldspathic gneiss |
| | | AAm | Fine grained amphibolite gneiss |
| | | AAn | Hornblende-rich paragneiss |
| | Rocks older than Prince Albert Group were not identified | | |

by Borealis Exploration Ltd. in the summers of 1969 and 1970 (Wilson and Underhill, 1971; Laporte, 1974a). In 1982, Borealis Exploration Ltd. tested the A and B deposits near Roche Bay with 3,500 m of drilling in anticipation of bringing the deposits into production. In 1983, trace amounts of gold and silver were detected in samples being tested for metallurgical purposes and the 1982 core was relogged and resampled for gold (Gibbins, 1985, p. 135). Aquitaine Company of Canada Ltd. explored 24 prospecting permits in Southern Melville Peninsula between 1970 and 1973. Aquitane's work included several thousand line kilometres of airborne magnetic, EM and radiometric surveys (Laporte, 1974a, 1974b; and Padgham and others 1976).

Cominco Ltd. and Noranda Exploration Ltd. did some mineral exploration on Melville Peninsula in 1979 and 1980 respectively (Gibbins, 1983b and 1984). However, Melville Peninsula has not been the scene of many major mineral exploration projects.

## MELVILLE PENINSULA RECONNAISSANCE

Borealis Exploraton Ltd.
1700 Aquitane Tower
540 - 5th Ave. S.W.
Calgary, Alta., T2P 0M2

Gold, Zinc,
Nickel, Iron
46 N,O,P and 47 A,B
67°-69°N,81°30'-86°W

### REFERENCES

Cameron (1979); Frisch (1982); Henderson (1983); Heywood (1967, 1974); Maurice (1979); and Schau (1984).

DIAND assessment reports: 081765 to 081768 and 081960 to 081965.

### PROPERTY

25 Prospecting permits and various claim groups:

A) PRINCE ALBERT GROUP PROJECT
Group 1 Prospecting Permits 906-909 47 A/3,4
Group 2 Prospecting Permits 910-913 47 A/5
Group 3 Prospecting Permits 1001-1004 47 A/11,14
Group 4 Prospecting Permits 1005-1007 47 B/2,7,8

B) PENRYHN GROUP PROJECT
Group 5 Prospecting Permits 1056-1059 46 P/12
Group 6 Prospecting Permits 1060-1063 46 0/8 P/5
Group 7 Prospecting Permits 1064 and 1065 46 N/1
14 Z1 claims (46 0/1,2); 3 Z2 claims (46 0/4); and 2 Z3 claims (46 0/5,6).

### LOCATION

The permits and claim groups are all in central or southern Melville Peninsula (6 in Fig. 4-1).Figure 4-13 shows the location of permit areas and simplified geology.

### HISTORY

Prospecting Permits 906-913 were granted in 1983; Permits 1001-1007 were granted in 1984; and Permits 1056-1065 were granted in 1985. Permits 910, 912 and 913 were relinquished in 1985 and Permits 906-908 and 1001, 1003-1005 and 1007 in 1986.

The reconnaissance project and permit acquisition strategy was based mainly on previous mineral exploration on Melville Peninsula. Considerable use has been made of geophysical surveys by Aquitaine Company of Canada Ltd. and the Geological Survey of Canada, and geochemical surveys by the Geological Survey of Canada (Maurice, 1979 and Cameron, 1979) to delineate target areas.

### DESCRIPTION

Parts of Melville Peninsula have been mapped and described by Heywood (1967 and 1974), Henderson (1983), Schau (1984) and Frisch (1982). Their work is summarized in the preceeding introduction to Melville Peninsula.

The first four groups of prospecting permits, acquired in 1983 and 1984, are concentrated in areas of Prince Albert Group rocks where gold in iron formation is the principal target. The second group of permits, obtained in 1985, are in areas of Penrhyn Group supracrustal rocks, where gossans and geochemical anomalies may reflect base metal as well as gold-rich deposits (Fig. 4-13).

### CURRENT WORK AND RESULTS

Most of the permit areas were prospected on a reconnaissance level in 1984 and/or 1985. An airborne reconnaissance survey identified gossans and other prospective looking areas for follow-up mapping and sampling. In 1984, the field crews included several geologists from Anaconda Canada Exploration Ltd.

Individual groups of prospecting permits and claims are described in the following sections. Only 6 permits were retained in good standing as of April 1, 1986.

## PROSPECTING PERMITS 906-909

Borealis Exploration Ltd.
1700 Aquitane Tower
540 - 5th Ave. S.W.
Calgary, Alta., T2P 0M2

Gold
47 A/3, 4
68°-68°15'N,
82°30'-84°W

### REFERENCES

Heywood (1967); Schau (1984).

DIAND assessment reports: 081765 and 081965.

### PROPERTY

Prospecting Permits 906-909 (Group 1).

### LOCATION

Group 1 permits are in central Melville Peninsula 80 to 140 km southwest of Hall Beach and 75 to 135 km east of Mackar Inlet (Fig. 4-13).

### HISTORY

The permits were granted February 1, 1983. Permits 906-908 were relinquished in 1986.

### DESCRIPTION

A thin band of Prince Albert Group greenstone trends northeasterly through the permit areas (Heywood, 1967 and Schau, 1984). A thin layer of oxide-facies iron formation is contained in meta-volcanic rocks on permits 906 and 907. A discontinuous gossan layer, possibly silicate-facies iron formation, is a short distance to the south.

### CURRENT WORK AND RESULTS

In 1984, 48 gossans or otherwise anomalous features were identified from the aerial reconnaissance of this area. Follow-up ground traverses sampled the gossans and defined the local stratigraphic sequence. Traces of pyrite, chalcopyrite and/or arsenopyrite were identified in several of the gossan zones in permit areas 906-908. Large massive quartz veins and pegmatites are common in Permit 906. One sample of quartz vein collected in Permit 906 in 1985 assayed 324 ppb Au and 17.5 ppm Ag. However, a second sample assayed only 25 ppb Au and less than 0.02 ppm Ag. None of the other samples were anomalous.

Prospecting Permit 909 has very little outcrop, although magnetic maps indicate that the greenstone belt crosses it. None of the 22 soil samples collected in this area were anomalous in gold or silver.

## PROSPECTING PERMITS 910-913

| | |
|---|---|
| Borealis Exploration Ltd. | Gold |
| 1700 Aquitane Tower | 47 A/5 |
| 540 - 5th Ave. S.W. | 68°15'-68°30'N, |
| Calgary, Alta., T2P OM2 | 83°-89°W |

### REFERENCES

Heywood (1967); Schau (1984).
DIAND assessment report: 081766.

### PROPERTY

Prospecting Permits 910-913 (Group 2).

### LOCATION

Group 2 permits are in central Melville Peninsula 15 to 55 km west of Roche Bay and 70 to 110 km east of Mackar Inlet (Fig. 4-13).

### HISTORY

The permits were granted in February 1983. All but Permit 911 were relinquished at the end of 1985. NTS area 47 A/5 was previously covered by Prospecting Permit 58, granted to Borealis Exploration Ltd. in 1968.

### DESCRIPTION

The area is underlain by a greenstone belt of the Prince Albert Group (Heywood, 1967 and Schau, 1984).

### CURRENT WORK AND RESULTS

Gossans were identified on all four permit areas, during the airborne reconnaissance. However, all of the ground follow-up was done in three relatively small areas in Prospecting Permit 911, where gold anomalies are associated with arsenopyrite and pyrite in banded magnetite and sulphide-facies iron formation.

## PROSPECTING PERMITS 1001-1004

| | |
|---|---|
| Borealis Exploration Ltd. | Gold |
| 1700 Aquitane Tower | 47 A/11,14 |
| 540 - 5th Ave. S.W. | 68°30'-69°N, |
| Calgary, Alta., T2P OM2 | 82°30'-83°W |

### REFERENCES

Schau (1984).
DIAND assessment reports: 081767 and 081964.

### PROPERTY

Prospecting Permits 1001-1004 (Group 3).

### LOCATION

Group 3 permits form a north-trending row of permits, 50 to 70 km west of Hall Beach. They include the westernmost shore of Hall Lake and adjacent area (Fig. 4-13).

### HISTORY

The permits were granted February 1, 1984. Only the southern-most permit 1001 (47 A/11 SW) was retained in early 1986.

### DESCRIPTION

The area is underlain by Prince Albert Group metavolcanic rocks (Shau, 1984). The permit areas are at the northeastern end of the eastern block of Prince Albert Group where the normal northeast trend is deflected northerly and even north-northwesterly (Fig. 4-13). The area has undergone intense deformation and metamorphism.

### CURRENT WORK AND RESULTS

The 1984 aerial reconnaissance indicated most of the gossans to be in permit areas 1001 and 1002. Consequently, the ground follow-up was mainly in these areas, where gold is associated with sulphide-facies iron formation and arsenopyrite. Detailed work in 1985 showed that there are two types of sulphide mineralization. The first consists of disseminated arsenopyrite and pyrite in silicate iron formation and narrow, discontinuous, silicified gossan zones in basalt. The second type consists of pods of massive arsenopyrite within and along contacts of oxide-facies iron formation. Several grab samples from these 1 to 3 m wide pods assayed from 144 to 1380 ppb Au.

Permit areas 1003 and 1004 are underlain mainly by pillow basalt of the Prince Albert Group. Iron formation is very thin when present and economically significant sulphide minerals were not discovered.

## Z1, Z2 AND Z3 CLAIMS

| | |
|---|---|
| Borealis Exploration Ltd. | Zinc, Nickel |
| 1700 Aquitane Tower | 46 0/1-6 |
| 540 - 5th Ave. S.W. | 67°-67°30'N, |
| Calgary, Alta., T2P OM2 | 82°50'-83°50'W |

### REFERENCES

Geological Survey of Canada (1978a,b); Henderson (1983).

### PROPERTY

Z1 1-4 in 46 0/1,2; Z2 1-3 in 46 0/4; and Z3 1-2.

### LOCATION

The claims are in central southern Melville Peninsula (Fig. 4-13).

### HISTORY

The area was covered by regional geochemical surveys in 1977 (Geological Survey of Canada, 1978a,b). The claims were staked in September 1984.

### DESCRIPTION

The claims are underlain by metavolcanics and metasediments of the Penrhyn Group (Henderson, 1983 and Fig. 4-13).

### CURRENT WORK AND RESULTS

In 1985, the claims were prospected, sampled and partially mapped. There are zinc and nickel anomalies along the contact of graphitic schists with dolomite.

## PROSPECTING PERMITS 1005-1007

| | |
|---|---|
| Borealis Exploration Ltd. | Zinc, Gold, Molybdenum |
| 1700 Aquitane Tower | 47 B/2, 7, 8 |
| 540 - 5th Ave. S.W. | 68°-68°30'N, 85°-85°30'W |
| Calgary, Alta., T2P OM2 | |

### REFERENCES

Frisch (1982); Geological Survey of Canada (1978a,b); Gibbins (1984); Heywood (1967); Laporte (1974a); Maurice (1979).

DIAND assessment reports: 081768 and 081963.

### PROPERTY

Prospecting Permit 1005 47 B/2 SW
Prospecting Permit 1006 47 B/7 NE
Prospecting Permit 1007 47 B/8 NW

### LOCATION

The permits are on the west side of central Melville Peninsula, Permit 1005 is 25 to 40 km south of Mackar Inlet, and Permits 1006 and 1007 are 15 to 55 km northeast of Mackar Inlet (Fig. 4-13).

### HISTORY

NTS area 47 B/2 was held as Prospecting Permit 83 by Borealis Exploration Ltd. in 1969 and as Prospecting Permit 775 by Noranda Exploration Ltd. from 1981 to 1983 (Laporte, 1974a, Gibbins, 1984). In the past, Aquitaine Company of Canada Ltd. and Noranda Exploration Ltd. have staked claims in the area. Noranda Exploration Ltd.'s BETS claims were discussed by Gibbins (1984, p. 94-90).

The permits were issued February 1, 1984. Permits 1005 and 1007 have been relinquished.

### DESCRIPTION

The area, mapped by Heywood (1967) and Frisch (1982), includes Archean gneisses and the Prince Albert Group greenstone sequence, as well as the late Proterozoic Folster Lake Formation sedimentary sequence (Frisch, 1982).

Prospecting Permit 1005 includes most of the known Folster Lake Formation (Fig. 4-13). The Folster Lake Formation is a 800 m thick sequence of meta-arkose that rests unconformably on a metamorphosed regolith developed in Archean basement (Frisch, 1982). Maurice (1978) showed that the basement, which consists of granite and gneiss, is enriched in uranium.

Prospecting Permits 1006 and 1007 contain the northeastern end of the westerly belt of Prince Albert Group (Fig. 4-13).

### CURRENT WORK AND RESULTS

Areas for detailed investigation were selected on the basis of a study of all available geological reports and airborne prospecting.

On Permit 1005, a molybdenum showing, discovered and staked by Noranda Exploration Ltd. in 1980 (BETS claims, Gibbins, 1984), was re-examined. The showing, which comprises molybdenite localized along minor fracture zones, is restricted to a much smaller area than previously reported. Borealis Exploration Ltd. also sampled a rust-coloured limonitic gossan developed in volcanics of the Prince Albert Group. Noranda Exploration Ltd. reported a grab sample that assayed 4.8 ppm Au (0.17 oz/ton) (Gibbins, 1984), however, the maximum assay obtained from Borealis Exploration Ltd. samples was 12 ppb Au.

Near the northwest corner of Prospecting Permit 1006, a gossan was sampled to see if it could be related to the anomalous silver content (10 ppm) of a nearby lake sediment sample (Geological Survey of Canada, 1978a). During this work, a sphalerite-bearing frost boil was found south of the anomalous lake. A grab sample assayed 8.50% Zn, 65 ppb Au, 10 ppm Pb and 2 ppm Ag. Detailed work, done in 1985, indicates that the zinc-rich boulder is not typical of the frost heave or local till and must have been transported to its present site. Geological mapping outlined two narrow northwest-trending belts of chlorite schist in the area. Lithogeochemical samples of this unit gave several anomalous nickel contents in the range 112 to 212 ppm.

No ground follow-up was done in Prospecting Permit 1007.

## PROSPECTING PERMITS 1056-1059

| | |
|---|---|
| Borealis Exploration Ltd. | Gold |
| 1700 Aquitane Tower | 46 P/12 |
| 540 - 5th Ave. S.W. | 67°30'-67°37'30''N, |
| Calgary, Alta., T2P OM2 | 81°30'-82°W |

### REFERENCES

Heywood (1967); Geological Survey of Canada (1978b); Laporte (1974a,b).

DIAND assessment report: 089162.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1056 | 46 P/12 NE |
| Prospecting Permit 1057 | 46 P/12 NW |
| Prospecting Permit 1058 | 46 P/12 SE |
| Prospecting Permit 1059 | 46 P/12 SW |

### LOCATION

The permits are near the eastern coast of southern Melville Peninsula (Fig. 4-13). They are 30 to 55 km south of Hall Beach and 220 to 240 km northeast of Repulse Bay.

### HISTORY

The area was included in Prospecting Permit 199 issued to Aquitaine Company of Canada in 1970-72 (Laporte 1974a,b).

The present permits were issued February 1, 1985 and relinquished April 1, 1986.

### DESCRIPTION

The permit area includes the eastern end of a large belt of Penrhyn Group rocks (Fig. 4-13 and Heywood, 1967).

### CURRENT WORK AND RESULTS

Areas of gossan and anomalous arsenic in lake sediments (Geological Survey of Canada, 1978b) were selected for further testing. Except for one sample of arsenopyrite-bearing rock from Prospecting Permit 1059 assaying 490 ppb Au, nothing warranting additional work was discovered in permit areas 1056, 1058 and 1059.

Most of the 1985 follow-up work was centered around a small lake in the center of the southern quarter of Prospecting Permit 1057. The Geological Survey of Canada (1978b) had collected a highly anomalous (220 ppm As) lake sediment sample from this lake. The source of this anomaly was traced to a gossan in pelitic gneiss southwest of the lake. Two samples of this rock have anomalous gold content of 515 and 233 ppb Au. However, other gossans developed in the pelitic gneiss and a marble unit did not contain anomalous quantities of gold.

The best gold assays were obtained from a quartz-pebble conglomerate at the base of a quartzite unit that outcrops as ridges in the southeast corner of the permit area. Pyrite, pyrrhotite and locally arsenopyrite and sphalerite are abundant in the matrix of this basal conglomerate. Gold, zinc, nickel and cobalt anomalies are reported in rock samples from these ridges.

## PROSPECTING PERMIT 1060-1063

| | |
|---|---|
| Borealis Exploration Ltd. | Gold |
| 1700 Aquitane Tower | 46 O/8,P/5 |
| 540 - 5th Ave. S.W. | 67°22'30''-67°30'N |
| Calgary, Alta., T2P 0M2 | 81°30'-82°30'W |

### REFERENCES

Geological Survey of Canada (1978b); Henderson (1983); Heywood (1967); Laporte (1974a, and 1974b).

DIAND assessment report: 081960.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1060 | 46 P/5 NE |
| Prospecting Permit 1061 | 46 P/5 NW |
| Prospecting Permit 1062 | 46 O/8 NE |
| Prospecting Permit 1063 | 46 O/8 NW |

### LOCATION

The permits form an east-trending block near the eastern coast of Melville Peninsula. They are 190 to 230 km northeast of Repulse Bay (Fig. 4-13).

### HISTORY

The area was formerly included in Prospecting Permits 190 and 196 granted to Aquitaine Company of Canada Ltd. in April 1970. They flew airborne radiometric, EM and magnetic surveys over this and adjacent areas (Laporte, 1974a and 1974b).

The current permits were issued February 1, 1985 and relinquished April 1, 1986.

### DESCRIPTION

The permits are underlain by supracrustal rocks of the Penrhyn Group (Fig. 4-13 and Heywood, 1967). Table 4-13 summarizes lithologic units in the Penrhyn Group.

### CURRENT WORK AND RESULTS

Several lakes in Prospecting Permits 1060-1062 have anomalous concentrations of arsenic in their sediments. In 1985, Borealis Exploration Ltd. sampled several gossans in this area but anomalous or encouraging gold levels were not encountered.

A highly anomalous (320 ppm As) lake sediment sample was collected by the Geological Survey of Canada (1978b) in the southeast quarter of Prospecting Permit 1063. However, soil and rock samples, collected in the vicinity of this lake by Borealis Exploration Ltd., did not have anomalous concentrations of gold or silver. They concluded that the arsenic anomaly is related to arsenopyrite mineralization at the contact of a diabase dyke.

South of this lake, several gossans identified by airborne reconnaissance, were sampled. One of these contained a massive arsenopyrite pod 3 m wide in weathered quartzite. This material assayed 2310 ppb Au. The next highest assay was 47 ppb Au from a small (20 cm diameter) pod of arsenopyrite in nearby quartzite.

## PROSPECTING PERMITS 1064 and 1065

| | |
|---|---|
| Borealis Exploration Ltd. | Zinc, Nickel |
| 1700 Aquitane Tower | 46 N/1 |
| 540 - 5th Ave. S.W. | 67°7'30''-67°15'N |
| Calgary, Alta., T2P OM2 | 84°-84°30'W |

### REFERENCES

Cameron (1979); Geological Survey of Canada (1978a and 1978b); Henderson (1983); Laporte (1974a).

DIAND assessment report: 081961.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1064 | 46 N/1 NE |
| Prospecting Permit 1065 | 46 N/1 NW |

### LOCATION

The permit area is in central southern Melville Peninsula 16 to 28 km north of the northeast end of Lyon Inlet and 105 to 120 km northeast of the community of Repulse Bay (Fig. 4-13).

### HISTORY

NTS area 46 N/1 was covered by Prospecting Permit 180 issued to Aquitaine Company of Canada Ltd. between 1970 and 1972. They identified anomalous radioactivity in the southern half of the area (Laporte, 1974a, p. 123-125).

A 1977 regional lake sediment geochemical survey outlined a number of zinc anomalies in the permit areas (Geological Survey of Canada, 1978a and 1978b). In 1978, Cameron, of the GSC, conducted detailed follow-up work in several of these areas, tracing anomalous base metal readings to their sources by sampling surface waters. He outlined two areas in the permit area that have high zinc and nickel content (Cameron, 1979).

Prospecting Permits 1064 and 1065 were granted February 1985.

### DESCRIPTION

The area is underlain by Penrhyn Group supracrustal rocks and Archean granite to granodiorite gneisses (Henderson, 1983 and Table 4-12).

### CURRENT WORK AND RESULTS

The 1985 field work was largely confined to the southeast quarter of Prospecting Permit 1064 and the northwest corner of Prospecting Permit 1065 where Cameron (1979) had earlier identified zinc and nickel anomalies in surface water.

Samples of pelitic gneiss from Prospecting Permit 1064 were not enriched in base metals. This was not surprising, as Cameron (1979) pointed out, recent oxidation would have removed any base metal sulphides from the surface. Several soil samples from Permit 1064 did contain anomalous concentration of zinc and nickel. The highest assay was 6,200 ppb Zn, 2,850 ppb Ni and 248 ppb Co.

A soil geochemistry survey of the northwest corner of Prospecting Permit 1065 confirmed the zinc and nickel anomalies of Cameron (1979). One sample assayed 4,400 ppb Zn and 1,160 ppb Ni. The next best sample was less than 500 ppb Zn.

## CENTRAL BAFFIN ISLAND

## PROSPECTING PERMITS 1103-1105

| | |
|---|---|
| Petro-Canada Ltd. | Gold |
| P.O. Box 2844 | 27 B/12,13 |
| Calgary, Alta., T2P 3E3 | 68°50'N,71°45'W |

### REFERENCES

Geological Survey of Canada (1980b to 1981c); Gibbins (1984); Henderson (1982, 1985); Jackson and Taylor (1972); Morgan and others (1975, 1976); Sangster (1981).

DIAND assessment report: 082051.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1103 | 27 B/13 NW |
| Prospecting Permit 1104 | 27 B/13 SW |
| Prospecting Permit 1105 | 27 B/12 NW |

### LOCATION

The permits cover west-central Baffin Island and lie between the Barnes Ice Cap to the east and the Foxe Basin to the west (in Fig. 4-7). If prior arrangements have been made with the Department of National Defence, Twin Otter aircraft can land at the Longstaff Bluff or Dewar Lakes DEW-line sites in the western and eastern parts of the area.

### HISTORY

Cominco Ltd. geologists became interested in the area from maps published by the Geological Survey of Canada (1980b) as part of their National Geochemical Reconnaissance-Uranium Reconnaissance Program and geological reports by Morgan and others (1975 and 1976) and Henderson (1982 and 1985). In 1981, Cominco Ltd. geologists examined an area of Piling Group metasediments that showed high arsenic assays in lake sediment samples collected by the Geological Survey of Canada (1981c). It was felt that the area had some potential for pyrrhotite-arsenopyrite-gold mineralization similar to the Homestake Mine in South Dakota or the Lupin Mine in the District of Mackenzie, NWT. However, prospecting and sampling did not provide encouragement. They also spent a couple of days looking at marble units, believed to be favourable host rocks for Black-Angel-type zinc-lead deposits (Sangster, 1981). The permits were granted February 1, 1986 and relinquished April 1, 1986.

### DESCRIPTION

The area is largely underlain by metasediments of the Piling Group known as the Foxe Fold Belt (Jackson and Taylor, 1972). These Aphebian age rocks are typically metamorphosed and complexly deformed. The Foxe Fold Belt stretches westward across central Baffin Island (just south of the Barnes Ice Cap) and extends westward to southern Melville Peninsula, where the meta-sediments are known as the Penrhyn Group, and eastward to western Greenland, where they form the Karrat and Umanak Groups and host the Black Angel deposit. Morgan and others (1975) subdivided the Piling Group into two lithological sequences: quartzite-marble-schist sequence; and metagreywackes and slates.

The lower quartzite-marble-schist sequence wraps around a series of basement culminations that resemble gneiss domes and are situated along the northern margin of the Piling Group. To the south, a thick, well-bedded series of metagreywackes and slates overlie the quartzite-marble-schist sequence. Throughout the greywacke sequence there are a few beds of quartzite, meta-arkose, carbonate rocks, calc-silicate rocks, tuffs and sulphide iron formation.

Spectacular gossans are ubiquitous within rusty graphitic schists at the top of the quartzite-marble-schist sequence and in the lower part of the metagreywacke-slate sequence in the northern part of the Piling Group. The gossans develop from sulphide facies iron formation, form horizons that range in thickness up to a maximum of 30 m (100 ft), contain pyrite and pyrrhotite (either disseminated or forming massive beds), and give fairly strong magnetic anomalies. Minor amounts of chalcopyrite occur locally.

Marble and calc-silicate gneisses in the attenuated zones of Piling Group rocks north of Flint Lake, locally contain traces of galena (69°20'00"N, 75°10'27"W) and fluorspar (69°20'N, 75°01'48"W). The quartzite-marble-schist sequence also contains traces of galena with minor malachite-azurite stain, south of Flint Lake (69°09'45"N, 74°05'27"W) (Morgan and others, 1975).

## CURRENT WORK AND RESULTS

The 1985 exploration program was conducted by a five-person geological crew with helicopter support, based at the Dewar Lakes DEW line site. Work consisted of a detailed lake sediment sampling survey, in the vicinity of lake sediment anomalies outlined by the Geological Survey of Canada (1981c), as well as ground traversing, prospecting, and soil sampling. The 1985 work covered NTS areas 27B, 37A and 37D.

After statistical analysis of the lake sediment data, three clusters of anomalous samples were recognized. The most important cluster or group (71°25'W to 72°05'W and 68°40'N to 69°00'N) contains 22 samples anomalous in arsenic, silver, nickel, copper and lead. The second group is also anomalous in these elements, but the third is anomalous in copper and lead only.

Ground traversing and prospecting led to the discovery of gossans derived from sulphide (pyrrhotite) and oxide facies iron formation, some of which are anomalous arsenic content and may be favourable targets for Lupin-Homestake type gold deposits.

Follow-up work consisting of airborne geophysics and gold geochemistry were recommended for areas of known geochemical anomalies and iron formation.

Prospecting Permits 1103-1105 were granted to Petro-Canada Ltd. on February 1, 1986. This covered an area that coincides with an arsenic-in-lake-sediment anomaly outlined by the Geological Survey of Canada (1981c), as well as the 1985 Petro-Canada Survey.

## CARVINGSTONE IN THE ARCTIC ISLANDS

Carvingstone is one of three mineral commodities presently being mined in the Canadian Arctic. Its economic significance is greatly enhanced by value added during local secondary processing, carving. The economic importance of these activities to the northern and national economies is indicated by payments estimated at $10 million divided amoung some 2,000 Inuit carvers in 1981. Transportation, wholesaling and marketing costs add an equal or greater value to the final retail value of goods and services. The cash value of these carvings to the Inuit of the Eastern Arctic was exceeded only by Government wages and transfer payments. Carving is, in many instances, an alternate to unemployment and a source of readily available cash income.

The 1982 economic recession had a devastating effect on the sale and production of Inuit carvings and prints. New initiatives are required to cut costs, improve quality, reduce inventories, and promote an interest and appreciation of Inuit sculptures, if this valuable sector of the Northern economy is to continue to contribute to the welfare and culture of the country (Gibbins, 1984).

The Geology Division of the Department of Indian Affairs and Northern Development has been asked from time to time to assist in the exploration and assessment of potential carvingstone. In 1975, DIAND's Geology Division sponsored a report on carvingstone occurrences in Southern Baffin Island (Hogarth, 1975).

In 1981, the Arctic Islands District Geologist was asked to help find new sources of carvingstone in the Cumberland Peninsula area, near the communities of Pangnirtung and Broughton Island. No new sources were located in this area, although several prospective ultramafic and marble outcrops were examined.

Subsequently, the Arctic Islands District Geologist was asked to examine the Mary River-Nuluujaak Mountain area, where some carvingstone was being quarried. During his visit, Phillip Pitseolak, an Inuit carver from Pond Inlet, discovered a new source of excellent quality carvingstone while prospecting an area of ultrabasic rocks, shown on Geological Survey of Canada Map 1451A, Icebound Lake (Jackson, 1978). The importance of this discovery is demonstrated by the fact that most of the carvings currently being created in Pond Inlet, Clyde River, Hall Beach and Igloolik are made from rock which came from this site.

In 1982-83, the Arctic Islands District Geologist examined areas of carvingstone potential in southern and northern Baffin Island (Hoare Bay and Icebound Lake areas) and Prince of Wales Island (Flexure Bay and Savage Point) (Gibbins, 1985 p. 150-153). This work was continued in 1984 and 1985 and is described in the following sections. The areas are plotted in Figure 4-1, numbers 7 to 12.

In 1984, the author was assisted by carvers, Bart Hanna of Igloolik and Archie Komak of Cambridge Bay. Prof. Don Hogarth of the University of Ottawa accompanied the author to sites in southern Baffin Island in 1985.

## INMAN HARBOR

Carvingstone
76 M/16
67°51'N,110°15'W

### REFERENCES

Jenness (1922); Fraser (1964).

### LOCATION

This carvingstone site is about 3 km west of Inman Harbor (8 in Fig. 4-1), which is about 10 km southwest of the northwest corner of Bathurst Inlet. The site is on the west side of a large outcrop of granite and is difficult to spot.

### HISTORY

A number of saw and chisel marks indicate previous working. The site is not active at present, but was known and presumed to be active in the past 25 years (personal communication, Archie Komak, 1984). The rock at this site is true soapstone and is more suitable for lamps (Kudliks) and cooking pots than carvingtone and was presumably used for such, because of its softness, poor colour and polishability.

Jenness (1922, p. 53-54) reported a similar quarry in a large soapstone inclusion in granite near Port Epworth about 70 km west southwest of Inman Harbor.

### DESCRIPTION

The area was mapped as granite by the Geological Survey of Canada (Fraser, 1964). The quarry is a large metasomatized ultramafic inclusion in Archean granite.

### CURRENT WORK AND RESULTS

The author was led to the site by Archie Komak of Cambridge Bay in July 1984. Poor weather conditions meant that only a few minutes could be spent taking photos and samples.

This is one of the few occurrences of carvingstone in the Northwest Territories that fulfills the definition of soapstone or steatite. Soapstone is defined in the American Geological Institute's Glossary of Geology as: a metamorphic rock of massive, schistose or interlaced fibrous texture and soft, unctuous feel, composed essentially of talc with varying amounts of micas, chlorite, amphibole, pyroxene, etc. and derived from the alteration of ferromagnesian silicate minerals.

Rock from the Inman Harbor site is typically massive with a hint of schistosity. It is dark greenish-grey and appears to have been derived from a coarse grained protolith. Small 2 to 5 mm, darker, chlorite-rich areas are uniformly disseminated through the rock and give the distinct impression of fresh rain drops on the rock.

## HOPE BAY

Carvingstone
77 A/3
68°11'N, 106°42'W

### REFERENCES

Fraser (1964); Gibbins (1986); Gibbins and Hogarth (1986); Seaton (1984); Thorpe (1966, 1972).

### LOCATION

Serpentinized peridotite is 0.5 km inland from a small bay on the east side of Hope Bay. This bay is on the west side of a peninsula that projects northward into Melville Sound. Hope Bay falls on a straight line between the communities of Cambridge Bay, 125 km to the northeast and Bay Chimo (Umingmaktok), 75 km to the southwest (9 in Fig. 4-1).

### HISTORY

The northern part of the Hope Bay Volcanic Belt has been the focus for mineral exploration by Roberts Mining Ltd. in the late sixties (Thorpe, 1966, 1972) and by Noranda Exploration Ltd. from 1977 to 1983 (Seaton, 1984).

### DESCRIPTION

The area of interest is a 300 by 2700 m sill or lens of high magnesium or komatiitic peridotite. This sill intrudes variolitic and pillow basalts of northern Hope Bay Volcanic Belt (Fraser, 1964).

### CURRENT WORK AND RESULTS

Carvingstone in this area was brought to the author's attention by Dr. Ulrich Kretschmar who had worked in the area. Carvingstone and peridotite have been noted in mineral exploration reports for the area.

During the summers of 1984 and 1985, the Arctic Islands District Geologist made brief visits to the area and recognized and sampled serpentinized peridotite (Gibbins, 1986). Petrographic and whole rock geochemistry have confirmed the komatiitic nature of the peridotite (Gibbins and Hogarth, 1986). Additional study is in progress.

## LONGSTAFF BLUFF RECONNAISSANCE

Carvingstone
(A) 37 A/6, 7
68°30'N, 74°W
(B) 37 C/16
69048'N, 76°25'W

### REFERENCES

Jackson and Morgan (1978); Morgan and others (1975); Morgan (in press, a and b).

### LOCATION

South Tweedsmuir Island area (A) is 65 to 80 km southeast of Longstaff Bluff and includes the north end of the area north of the mouth of the Nadluarjuk River and numerous small islands in between. The second area (B) is 15 km north of Eqe Bay, about 120 km north-northwest of Longstaff Bluff. Both areas are on west-central Baffin Island (7 in Fig. 4-1).

### DESCRIPTION

The South Tweedsmuir Island area (A) is dominated by metamorphosed sediments of the Piling Group, whereas in the Eqe Bay area (B), the Archean Mary River Group prevails (Morgan and others, 1975 and Morgan, in press).

### CURRENT WORK AND RESULTS

The primary target area was metamorphosed ultramafic and mafic rocks. The areas chosen for examination were selected from Morgan (in press, a and b) and from a personal communication with Dr. Morgan. One day visits were made to both areas in August 1984.

In the South Tweedsmuir Island area (A), a number of outcrops of metamorphosed mafic and ultramafic lavas were examined. These rocks were too metamorphosed, amphibolite facies or higher, to have good carvingstone potential.

In area (B), north of Eqe Bay, the ultramafic mafic rocks are much more limited in area and are also amphibolite facies or higher.

The 1984 field work was too brief to properly assess the carvingstone potential of the area. However, the relatively high grade of metamorphism in much of the area (Jackson and Morgan, 1978) and the absence of a local native population do not make the region a priority area.

Future work should be directed to ultramafic and mafic rocks in areas of greenschist metamorphism and/or hydrothermal alteration.

## ABERDEEN BAY (MARKHAM BAY)

Carvingstone
35 P/16
63°45'41",72°11°4"W

### REFERENCES

Blackadar (1967a); Hogarth (1975).

### LOCATION

This occurrence is on the west shore of Aberdeen Bay, near the head or north end of the bay (10 in Fig. 4-1). It is about 150 km northwest of Lake Harbor and 225 km east southeast of Cape Dorset.

### HISTORY

The Aberdeen Bay carvingstone sites have been known and used for many years (Hogarth, 1975 and Blackadar, 1967a). The most actively used sites are near tide water and it has become traditional to load raw stone directly onto boats at low tide and refloat the craft with the next tide.

### DESCRIPTION

This occurrence is in crystalline limestone or dolomite (Blackadar, 1967a - map unit 8) in contact with pyroxene-hornblende gneiss (map unit 9).

Serpentine marble and calc-silicate rock contain several zones of almost pure, bright, yellow-green serpentine. The serpentine was probably formed by detrital quartz sand or by the action of silica-rich hydrothermal solutions during regional metamorphism of dolomite.

### CURRENT WORK AND RESULTS

In 1985, a brief visit was made to examine the carvingstone site. It represents the second major type of carvingstone, those formed by metamorphism of silicated dolomitic limestone to serpentine marble. The Aberdeen Bay sites have survived or been formed by the late phases of regional high-grade metamorphism.

## McKELLAR BAY

Carvingstone
25 K/13
62°46'56"N,69°30'58"W

### REFERENCES

Hogarth (1975).

### LOCATION

This occurrence is on the west shore of a small lake north of McKellar Bay, 20 km east-southeast of Lake Harbor (11 in Fig. 4-1).

### HISTORY

This is a well known carvingstone site. It was discovered in the late forties by Suluk Laeta and has been quarried since 1958 (Hogarth, 1975).

### DESCRIPTION

Altered (serpentinized) peridotite is quarried from a small ultramafic intrusion in granitic gneisses. Only portions that are completely serpentinized are quarried. The best carvingstone is almost completely altered to dull green serpentine and magnetite. The rock is massive, except for small veinlets of magnetite.

### CURRENT WORK AND RESULTS

A brief visit was made to this deposit in 1985 in order to familiarize the author with the geology and confirm its ultramafic nature. This occurrence, as well as the Mary River - Nuluujaak Mountain occurrence (Gibbins 1985), are examples of hydrous serpentinized ultramafic rocks in areas of high grade metamorphic rocks, where if geologic conditions are right. A late or post-metamorphic hydrothermal spring system best explains these local areas of serpentinization.

## CLEARWATER FIORD

Carvingstone
26 J/9
66°32'14"N,67°40'20"W

### REFERENCES

Hogarth (1975).

### LOCATION

This area is on the south shore of Clearwater Fiord, at the northwest end of Cumberland Sound and 100 km northwest of Pangnirtung (12 in Fig. 4-1).

### HISTORY

This occurrence was discovered by Jeetaloo Akalukyuk in the summer of 1973 (Hogarth, 1975). It has been the main local source of carvingstone in the Cumberland Sound area, but has not been able to meet the volume requirements of Pangnirtung carvers.

### DESCRIPTION

Several narrow alteration zones of dark green chlorite and epidote formed in biotite-microcline-quartz granite. Some of this material is good quality carvingstone, but a lot of unsuitable rock is mixed in with it.

According to Hogarth (1975), the main mineral in this rock is illite, a potassium aluminum silicate, a hydromica or clay mineral.

### CURRENT WORK AND RESULTS

In 1985, the Economic Development section of the Government of the Northwest Territories contracted Granite Consulting Ltd. of Surrey, B.C. and several local carvers to excavate rock for carving, remove waste rock and attempt to access more of the good quality rock.

## SOUTHERN BAFFIN ISLAND - MICA

Mica, graphite and several other minerals were produced from a number of places in Southern Baffin Island during the first period of European contact in the area. These mineral shipments also served as ballast on whaling ships. The two main areas of activity were near Lake Harbor, where phlogopite is the main mica mineral, and Cumberland Sound, where muscovite and graphite are present.

## NIANTE HARBOR

Mica
26 B/15
64°52'N,66°32'W

### REFERENCES

Blackadar (1967b); Millward (1930).

### LOCATION

The mica pit is about 2 km southwest of the northwest corner of Niante Harbor (also known as Niantaluk) near the center of the southwestern shore of Cumberland Sound (13 in Fig. 4-1). Pangnirtung is about 140 km in a direction 10° east of true north and Frobisher Bay is 165 km to the southwest.

### HISTORY

An American citizen, W. A Mentzer, is reported to have mined 13.6 t of mica valued at $120,000 from this site (Blackadar, 1967b; Millward, 1930). A request for a mining licence by Mentzer led directly to the transfer of the Arctic Islands to Canada by Great Britian in 1880.

### DESCRIPTION

A pod of pegmatite, in an area about 5 by 10 m, contains large crystals of muscovite mica, feldspar, rose quartz and tourmaline. Most of the large muscovite crystals stock piled at the site consist of herringbone or feather mica, which is marked by three sets of reeves or structural imperfections and are only good for scrap.

The pegmatite is near the contact of Blackadar's (1967b) biotite-quartz-feldspar gneiss and sillimanite gneiss.

### CURRENT WORK AND RESULTS

A brief visit was made to the mica pit in August 1985 to determine the geologic setting of the mica and to ascertain whether other possible economic minerals are present. Unusual or rare minerals were not observed. Drill holes in one wall of the pit indicate some later unreported mining efforts.

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# CHAPTER 5:
# KEEWATIN REGION

**P.J. Laporte**
**District Geologist, Keewatin Region**

## INTRODUCTION

In 1984 and 1985, the District Geologist, Keewatin Region, monitored mineral exploration in the mainland part of the Northwest Territories east of 102°W longitude. The Keewatin Region is part of the Churchill Structural Province of the Canadian Shield. It is underlain by Archean and Aphebian volcanic, sedimentary and plutonic rocks deformed and metamorphosed during the Hudsonian Orogeny. Shallow-dipping to flat-lying, unmetamorphosed to slightly metamorphosed rocks of the Aphebian and Helikian age locally overlie the metamorphic complex south and west of Baker Lake (Fig. 5-1).

In this report, the Keewatin Region has been subdivided into three main areas on the basis of geology and exploration targets (Fig. 5-1): the Ennadai Lake-Rankin Inlet area; the Baker Lake-Thelon River area; and the Chantrey Inlet-Wager Bay area. Most of the properties in the region encompass, or are adjacent to, lakes on which fixed-wing aircraft can land.

## CARIBOU PROTECTION MEASURES

The Caribou Protection Measures appended to the land use permits issued in the Keewatin in 1984 and 1985 were the same as the 1983 measures (Laporte, 1985a). Holders of land use permits were forbidden to operate within the Caribou Protection Areas (Fig. 5-2) between May 15 and July 15. However, operations begun before May 15 could be continued, upon approval of the Land Use Inspector, as long as caribou cows were not approaching the area of operation. If cows approached the area of operation, the permittee was to suspend operations and evacuate all personnel except those required for maintenance and protection of the camp facilities. Also, the Land Use Inspector could allow operators to occupy, before July 15, those parts of the Caribou Protection Areas that the caribou cows and calves were not expected to use.

If calving occurred outside the Caribou Protection Areas, permittees were to suspend operations in the areas occupied by cows and calves between May 15 and July 15. Permittees had to suspend blasting, overflights by aircraft at an altitude of less than 300 m above ground level and the use of snowmobiles and all-terrain vehicles in the vicinity of cow-calf aggregations.

Permittees were also forbidden to locate operations and to conduct activities, such as airborne surveys and the movement of equipment, which would interfere with migrating cows. Between May 15 and September 1, permittees could not diamond drill within 5 km of any Designated Crossing and could not construct a camp, cache fuel or conduct any blasting within 10 km of any Designated Crossing.

## ENNADAI LAKE-RANKIN INLET AREA

In this area, a complex of granitic gneisses, migmatites and intrusions enclose northeast-trending belts of Archean volcanic flows and pyroclastics, slate, greywacke, conglomerate and minor ironformation. The Archean rocks are unconformably overlain by Aphebian conglomerate, greywacke, quartzite, orthoquartzite, argillite and dolomite which, to the east, are interbedded with and overlain by basaltic flows. During the Hudsonian Orogeny, the Aphebian and Archean rocks were folded about northeasterly axes and intruded by quartz monzonite and granodiorite. Fluorite-bearing granite intruded the Archean-Aphebian complex during the Paleohelikian.

Precious metal deposits within the Archean volcanosedimentary assemblage are the main targets of mineral exploration in this area.

## ERIC SHOWING

Sunmist Energy '84 Inc.
206, 215 Tenth Ave. SW
Calgary, Alta., T2R OA4

Gold
55 E/11
61°34'N, 95°12'W

### REFERENCES

Davidson (1970); Laporte (1983b); Thorpe (1972).
DIAND assessment reports: 081787, 081790.

### PROPERTY

Prospecting Permit 1025, LAB 2, 3 — 55 E/11 SE

### LOCATION

The claims are in the west-central part of Prospecting Permit 1025, which straddles the narrow central reaches of Maguse Lake (Fig. 5-3).

### HISTORY

ERIC 1-12 were staked in 1966 to cover a gold showing discovered by Selco Northern Ltd. prospectors. ERIC 13-36 were added to the property in 1967 and the showing was geophysically and geochemically surveyed and probed with six Winkie holes totalling 44.6 m. Prospecting Permit 57 was acquired in 1968. Diamond drilling (1238.4 m in 12 holes), geological mapping, magnetic surveys, geochemical surveys and prospecting done in 1968 (Thorpe, 1972) indicated that the showing was not economic. The ERIC 13-36 lapsed in 1968, Prospecting Permit 57 was relinquished in 1969 and ERIC 1-12 lapsed in 1970.

GOLD 1-6 were staked in 1972 by L.K. Lyttle, who trenched the showing on GOLD 2 and 3 in 1973 and allowed the other claims to lapse. The two remaining GOLD claims were transferred to L. Dempster in 1975.

Mr. Dempster blasted a trench on the showing in 1979 and collected two channel samples containing 471.4 ppm Au over 15 cm and 23.6 ppm Au over 106.7 cm (Laporte, 1983b). GOLD 2 was allowed to lapse.

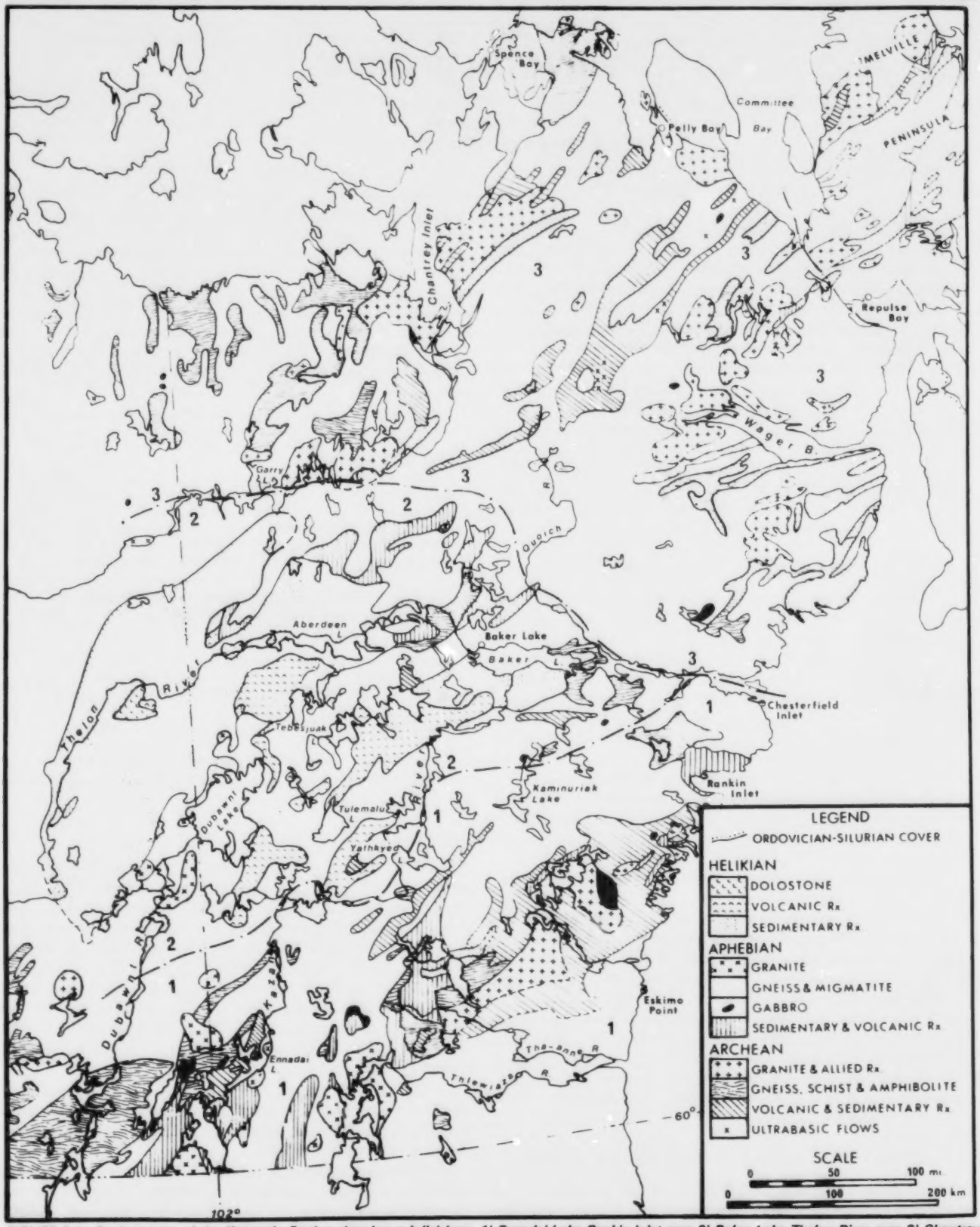



*FIGURE 5-1: Geology map of the Keewatin Region showing subdivisions: 1) Ennadai Lake-Rankin Inlet area 2) Baker Lake-Thelon River area 3) Chantrey Inlet-Wager Bay area.*

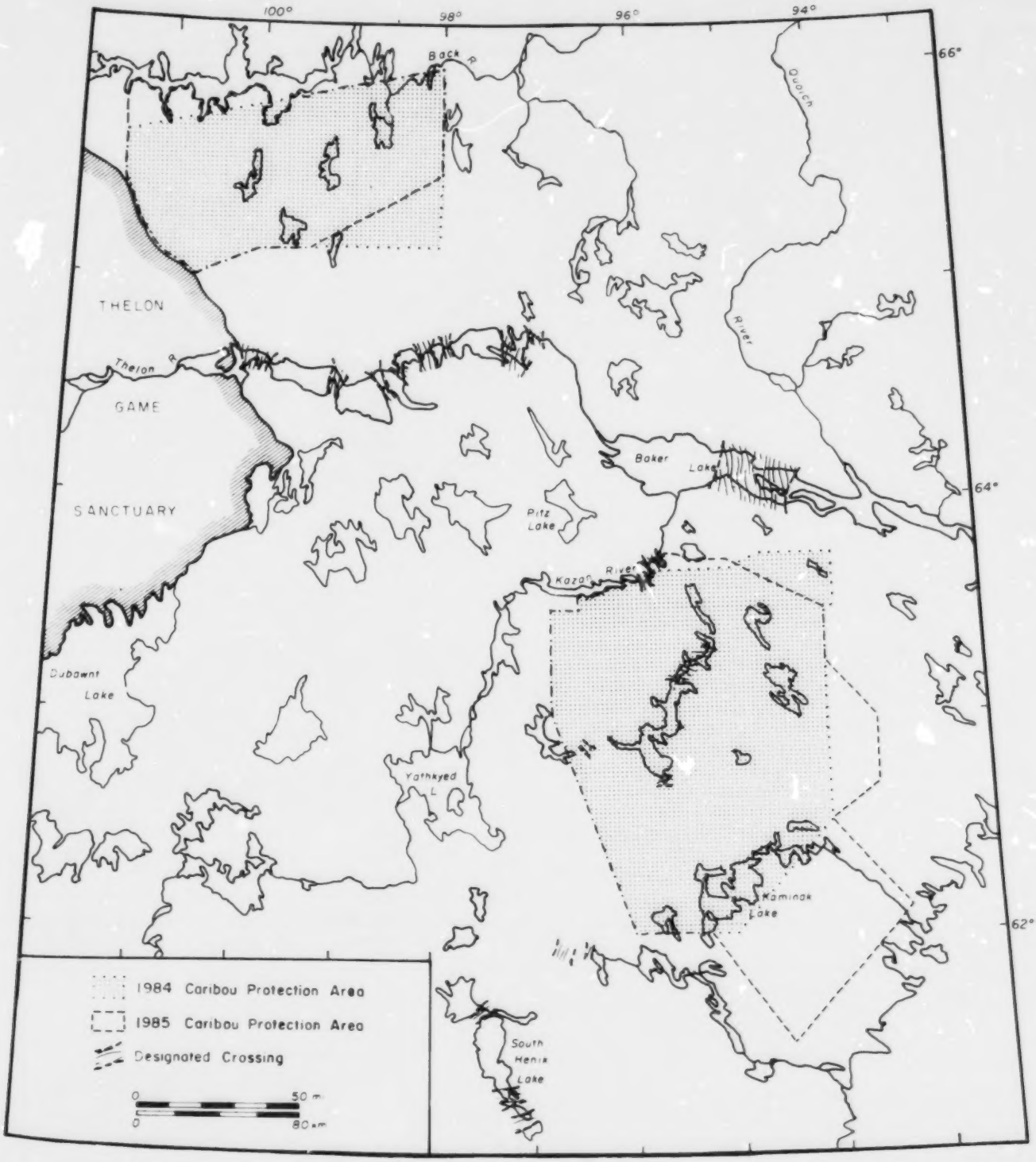



*FIGURE 5-2: Extent of areas affected by the Caribou Protection Measures in 1984 and 1985.*

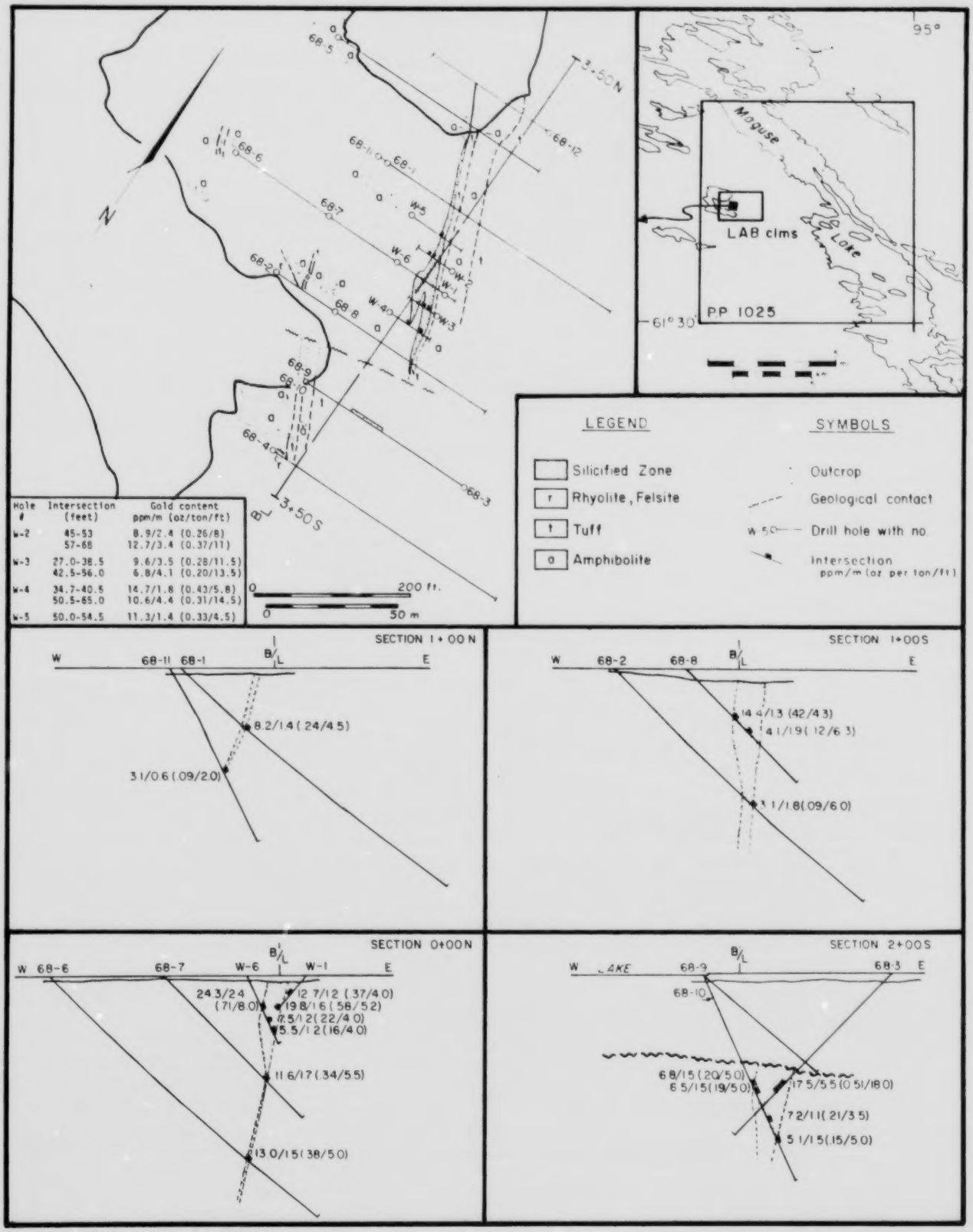



*FIGURE 5-3: Geology of the Eric Showing.*

In September 1980, J. Londry staked LAB 1 and 2 adjacent to GOLD 3. LAB 3 was staked, in 1982, when GOLD 3 lapsed. LAB 1 lapsed in 1982. In December 1983, LAB 2 and 3 were transferred to Arctic Mining Corporation Ltd. Prospecting Permit 1025 was acquired by Mike Magrum for the Corporation in 1984. In 1985, 141835 Canada Ltd. acquired the prospecting permit and 851846 NWT Ltd., a wholly owned subsidiary, acquired the claims. Sunmist Energy '84 Inc. acquired the property in early 1986.

### DESCRIPTION

Prospecting Permit 1025 is underlain by volcanic and sedimentary rocks of the Archean Kaminak Group, intruded in the southwest by Archean hornblende tonalite. Phyllite and schist, derived from the typical Archean greywacke-slate assemblage, underlie the eastern half of the permit area. Magnetite iron formation was observed locally and is deduced, from aeromagnetic data, to form extensive arcuate layers within the metasedimentary package. Mafic volcanic rocks, locally intercalated with more felsic flows and tephra, outcrop along the northern edge of the permit area and to the west in contact with the tonalite intrusion (Davidson, 1970).

The Eric Showing, on LAB 3, is within the mafic volcanic sequence near its contact with the tonalite. Detailed mapping by Selco Northern Ltd. indicates the showing is in amphibolitic andesite enclosing thin layers of metamorphosed rhyolite tuff and flows (Fig. 5-3). The rocks strike north and dip 75° west. Gold is in a zone of secondary silicification in the lower part of an andesite flow underlain by a rhyolite tuff layer 1.5 m thick. The thickness of the silicified zone varies from less than 1 m at the north end to 15.2 m at the south end. Pyrrhotite and minor chalcopyrite, pyrite and sphalerite constitute 5 to 10% of the rock and occur as streaks and lenses in the amphibolite bands and as intergrowths with wall-rock inclusions in the quartz veins. Rare specks of visible gold are present. The distribution of gold is erratic and shows no correlation with quartz and sulphide content of the rocks.

### CURRENT WORK AND RESULTS

In 1984, a three-person crew established a grid and prospected the showing. A magnetic survey outlined two parallel magnetic anomalies, one over the showing and the other 100 m to the west. A VLF-EM survey detected two conductors, with poor conductivity, parallel to the strike of the volcanic rocks. The gold-bearing silicified zone was not conductive. Most of the 42 rock samples collected contained less than 5 ppb Au.

## IGLOO PROJECT

Canadian Nickel Company Ltd. — Gold
Copper Cliff, Ont., — 55 K/3,6,7
POM INO — 65°15'N, 93°00'W

### REFERENCES

Heywood (1973); Laporte (1974a,b).
DIAND assessment reports: 081829, 081966.

### PROPERTY

| | |
|---|---|
| Prospecting Permits 1018 and 1019 | 55 K/3 N |
| Prospecting Permit 1073 | 55 K/6 SE |
| Prospecting Permits 1020 and 1021 | 55 K/7 S |

### LOCATION

The property extends along the north shore of Wilson Bay and from the west shore of Mistake Bay to the Ferguson River (Fig. 5-4).

### HISTORY

The first reports of exploration work in the area were submitted by Giant Yellowknife Mines Ltd., who held area 55 K/3 as Prospecting Permit 3 from 1961 to 1964, and North Rankin Nickel Mines Ltd., who held areas 55 K/6 and 7 as Prospecting Permits 17 and 18 from 1961 to 1962. Both companies prospected the area and outlined a number of uneconomic gold and copper showings. Giant Yellowknife Mines Ltd. staked and leased claims PEN 1-21 and STEIN 1-8, which cover iron deposits northwest of Mistake Bay, and 18 TORIN claims, covering copper-nickel and copper-gold showings on the Ferguson River.

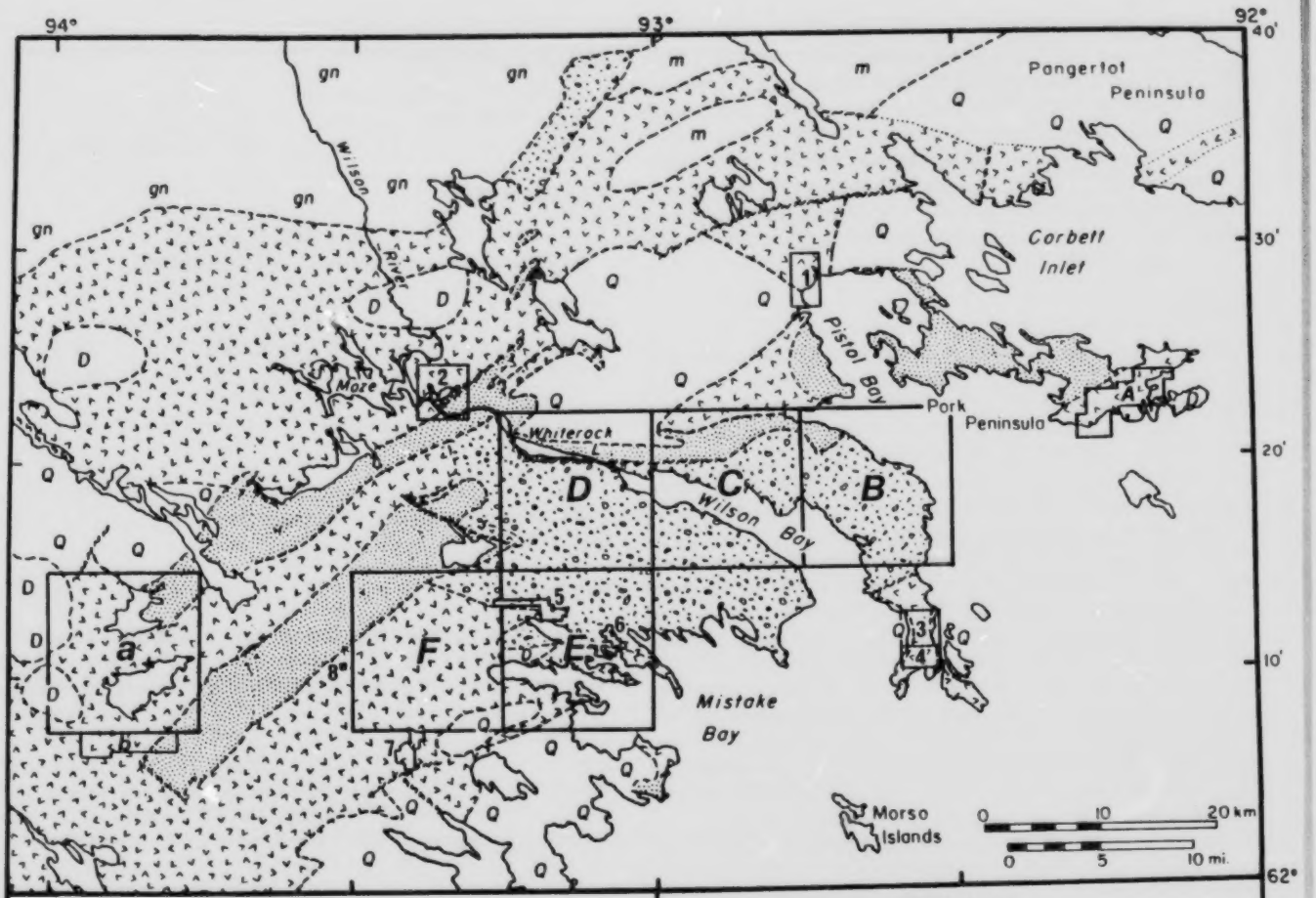
Husky Oil Ltd. held area 55 K/6 as Prospecting Permit 202 from 1970 to 1973 (Laporte, 1974a,b). Radiometric, electromagnetic and magnetic surveys flown in 1970 and subsequent ground geophysical and geological investigations in 1970 and 1972 failed to detect economic concentrations of metals.

Prospecting Permits 1018 to 1021 were acquired in 1984 to cover anomalous gold concentrations detected during reconnaissance geological and prospecting surveys done in 1983. Prospecting Permit 1073 was acquired in 1985.

### DESCRIPTION

Slate, argillite, impure sandstone and greywacke outcrop on the north shore of Mistake Bay and on both shores of Wilson Bay. These sediments enclose extensive arcuate layers of magnetite iron formation and are underlain to the southwest and northwest by mafic volcanic flows and tephra. The sediments and volcanics are part of the Archean Kaminak Group and are intruded, north of Wilson Bay and west of Mistake Bay, by quartz diorite, granodiorite and quartz monzonite plutons.

Aphebian Hurwitz Group rocks, including orthoquartzite of the Kinga Formation, slate and mudstone of the Ameto Formation and feldspathic sandstone to quartzite of the Tavani Formation, outcrop in northeast- to east-trending linear belts in the northern part of the permit areas (Heywood, 1973).




LEGEND

APHEBIAN
HURWITZ GROUP:
Orthoquartzite, slate and mudstone, mafic volcanic flows, quartzose and feldspathic sandstone

APHEBIAN and/or ARCHEAN
*m*: Gneiss and migmatite
*gn*: Layered gneiss and quartz-biotite schist
*D*: Diorite, gabbro

ARCHEAN
*Q*: Quartz diorite, granodiorite and quartz monzonite
KAMINAK GROUP:
Slate, argillite, impure sandstone, greywacke, iron-formation, conglomerate
Mafic to felsic volcanic rocks

PROPERTIES

Canadian Nickel Company Ltd.
A. PORK 1-2, 4-5
B. Prosp. Perm. 1020
C. Prosp. Perm. 1021
D. Prosp. Perm. 1073
E. Prosp. Perm. 1018
F. Prosp. Perm. 1019

Borealis Exploration Ltd.
a. Prosp. Perm. 1070
b. SUSAN, SUSAN 2-3

Silver Chief Minerals Ltd.
1. SCM 2
2. SC 1-2

3. CE C. Reich
4. EL E. Liesegang

Giant Yellowknife Mines Ltd.
5. PEN 1-21
6. STEIN 1-8
7. 18 TORIN

8. BM 1 Hudson Bay Exploration & Development Company Ltd.

*FIGURE 5-4: Geology and properties, Wilson Bay area (geology from Heywood, 1973).*

## CURRENT WORK AND RESULTS

In July and August of 1984, a four-person crew mapped and prospected the area and performed reconnaissance magnetic and vertical-loop EM surveys over 54 line km of grids. Of the 380 rock samples collected from iron formations, sulphide zones, quartz veins and altered lithologies, 35% contained more than 50 ppb Au. The geophysical surveys outlined conductors previously detected by other companies and traced overburden-covered extensions of iron formation layers. Three gold showings were detected, two in small diorite-gabbro plugs intruding mafic to felsic flows and one in a contorted sulphide-facies iron formation.

In May 1985, a 90 line km grid was established over the iron formation showing and explored with geophysical surveys. The magnetic survey defined the iron formation and outlined three

fold noses within the grid. A 49 line km HLEM survey did not detect any conductors of interest. A till sampling survey of the grid in August outlined several anomalies with concentrations up to 2300 ppb Au.

Prospecting Permit 1073 was prospected in late July and August and found to cover two previously unknown dioritic intrusions. One of the gold-bearing gabbro-diorite plugs outlined in 1984 was explored with IP, magnetic and HLEM surveys, mapping and lithogeochemical sampling. No magnetic or EM anomalies of interest were detected, but the IP survey outlined a few weak to moderate anomalies associated with disseminated sulphides. The gold is in podiform to linear alteration zones along the margin and within the intrusion. The podiform zones are up to tens of metres in diameter and the linear zones are tens of centimetres to several metres wide and up to 30 m long.

The alteration includes silicification, hematization and addition of iron carbonates and up to 10% combined arsenopyrite and pyrite. The enclosing quartz-rich volcanic sandstone and greywacke are also altered and sulphide-bearing near the contact with the diorite-gabbro plug.

## KEEWATIN GOLD PROJECT

Borealis Exploration Limited
1700-540 Fifth Ave. SW
Calgary, Alta., T2P OM2

Gold
55 K/4
62°11'N, 93°52'W

### REFERENCES

Heywood (1973); Laporte (1974a,b, 1976).
DIAND assessment reports: 017065, 081936, 081959.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1070 | 55 K/4 NW |
| SUSAN 1-3 | 55 K/4 SW |

### LOCATION

The property is southwest of Last Lake (Fig. 5-4).

### HISTORY

The Last Lake area was first explored by Hudson Bay Mining and Smelting Company Ltd. in the late 1940's. Trenches were blasted on the gold showing but the result of this work was not reported. Newmont Mining Corporation of Canada Ltd. was active in the area in the late 1950's. They acquired the GUN claims west of Last Lake to cover a copper showing.

Area 55 K/4 was then held as Prospecting Permit 4 by Giant Yellowknife Mines Ltd. from 1961 to 1964. Although the maps filed as representation work (report 017065) indicate a gold showing in the area now held as the SUSAN claims, the accompanying reports do not mention this showing.

The first mention of the showing is made in a report prepared for Husky Oil Ltd. who held area 55 K/4 as Prospecting Permit 201 from 1970 to 1973 (Laporte, 1974a,b). Airborne radiometric, magnetic and EM surveys of the area done in 1970 were followed up with prospecting and ground geophysical surveys of anomalies in 1970 and 1972. One of the areas investigated in 1970 was the lapsed REP claims, staked in 1964 by R. Puls, which covered the gold showing. One sample of quartz vein collected from the outcrop contained 17 ppm Au. A second sample of quartz vein with massive pyrite, found at an old campsite, contained 84 ppm Au.

The gold showing was restaked as the IT claims by W.H. Shenton, in April, 1973, and optioned to Denison Mines Ltd. and Coniagas Mines Ltd. (Laporte, 1976). Mapping and prospecting of the claims outlined numerous en echelon quartz-calcite veins near east-trending shear zones. Samples from the veins contained up to 48 ppm Au over 0.6 m.

In 1985, Borealis Exploration Limited, acquired Prospecting Permit 1070 to cover the gold showing on the lapsed REP and IT claims and an untested geophysical conductor on the GUN claims. The SUSAN claims were added to the property during the summer.

### DESCRIPTION

East- to northeast-trending mafic volcanic flows and tephra underlie the area west of Last Lake. The volcanics are intruded to the north by quartz diorite, granodiorite and quartz monzonite and to the west by diorite and gabbro. Quartzitic metasediments of the Hurwitz Group (Kinga, Ameto and Tavani Formations) overlie the volcanics in the northeast and southeast corner of the permit area (Heywood, 1973).

### CURRENT WORK AND RESULTS

The permit area was prospected, but most of the 1985 exploration was concentrated in the south-central part of the permit and on the adjacent SUSAN claims. A grid was established, surveyed with magnetometer and MaxMin, mapped and prospected. Old trenches, quartz veins and shear zones were sampled and frost boil samples were panned.

Gold concentrations of up to 500 ppm were found in northeast-trending quartz-veined shear zones, 0.3 to 5 m thick and 25 to 300 m long, in andesite and small diorite plugs (Fig. 5-5). These shear zones are subsidiary to major fracture zones up to 70 m wide and 3.5 km long which trend east-northeast. Samples of sheared andesite on the edge of a major fracture zone contained 5 ppm Au.

The shear zones and adjacent rocks are silicified and contain secondary ilmenite, leucoxene and euhedral grains of pyrite, pyrrhotite, chalcopyrite and, locally, arsenopyrite. Visible gold grains, up to 2 mm in diameter, are in calcite-cemented brecciated quartz veins. Gold flakes and nuggets, up to 7 mm in diameter, occur in the oxidized parts of the quartz-calcite veins with hematite, limonite and chlorite. Microscopic gold grains are associated with hematite and chlorite and are inclusions in arsenopyrite.

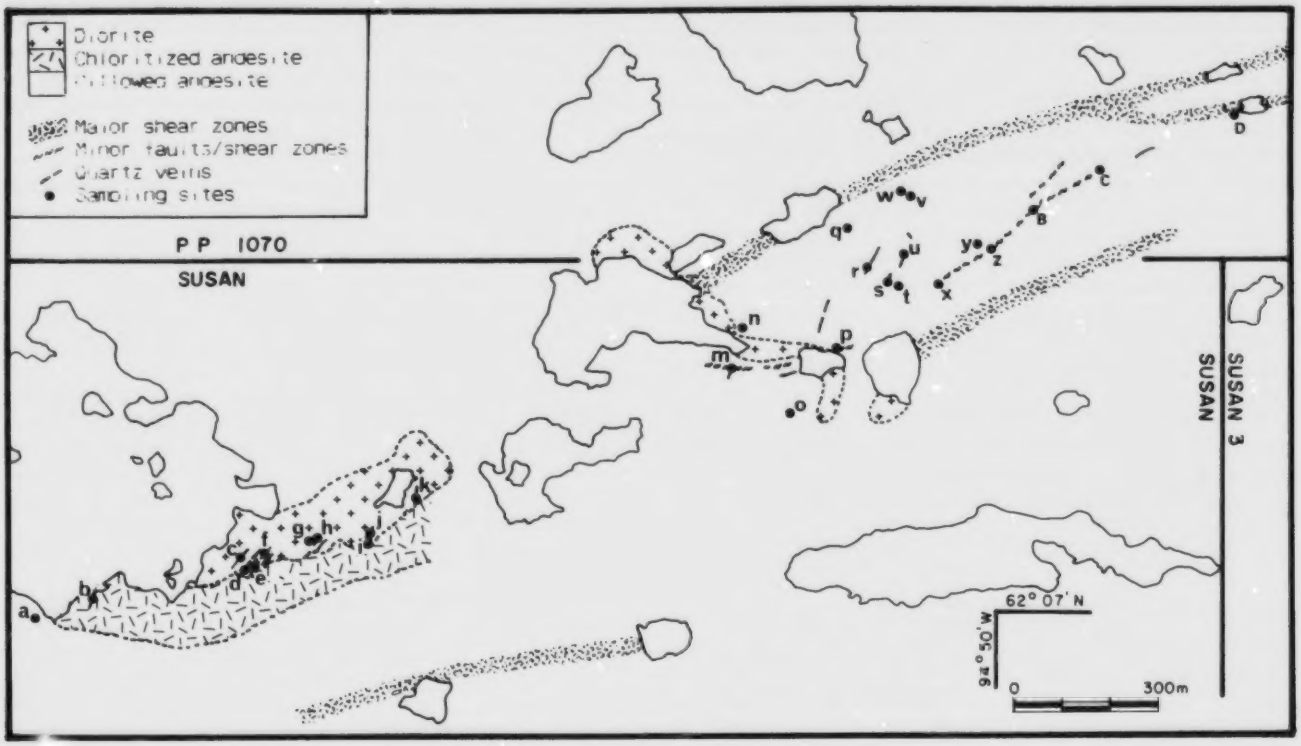



*FIGURE 5-5: Geology and sampling results, SUSAN claims.*

## PORK PENINSULA PROJECT

Canadian Nickel Co. Ltd. — Gold
Copper Cliff, Ont. — 55 K/8
P0M 1N0 — 62°23'N, 92°12'W

### REFERENCES

Heywood (1973); Laporte (1985a).
DIAND assessment report: 081919.

### PROPERTY

PORK 1,2,4,5 — 55 K/8

### LOCATION

The claims extend east across the eastern end of Pork Peninsula (Fig. 5-4).

### HISTORY

PORK 1-3 were staked in 1981 to cover a previously trenched but unreported gold showing on the west side of Pork Peninsula and a pyrite-pyrrhotite-chalcopyrite showing indicated on the published geological map of the Tavani area (Heywood, 1973). Samples collected from the trenches in 1981 contained 3.43 ppm Au over 6.09 m, 2.74 ppm Au over 8.84 m and 3.77 ppm Au over 7.82 m. PORK 4 was added to the property in 1982. In 1983, PORK 5 was added to the property and PORK 3 lapsed.

### DESCRIPTION

Pork Peninsula consists of a north-facing pile of Archean Kaminak Group pillow basalts and subvolcanic gabbro sills intruded to the southeast by a sheeted dyke complex of diorite and gabbro. The volcanics are overlain, in the northwestern part of the peninsula, by orthoquartzite of the Aphebian Hurwitz Group Kinga Formation (Heywood, 1973).

Geological mapping of the volcanics, in 1982 and 1983, outlined a number of interflow tuffaceous and exhalative layers 1 to 2 m wide and 10 m to 1 km long. The largest layer is 25 to 50 m wide and extends 7 km along the length of the peninsula. The tuffaceous/exhalative bands are foliated sericitic and chloritic schistose zones enclosing chert, iron formation and quartz-carbonate vein-like aggregations. Concordant to subconcordant feldspar-porphyry sills intrude the main tuffaceous band and the adjacent volcanic flows. Gold is associated with pyrite-rich parts of the banded oxide iron formation and pyrite-pyrrhotite concentrations in the quartz-carbonate aggregations. Samples of the main zone contain up to 7.58 ppm Au over 4.5 m (Laporte, 1985a).

### CURRENT WORK AND RESULTS

In 1984, a 17 hole (771 m) drill program tested the western 4.6 km portion of the main exhalite zone. Two areas were drilled at 100 m spacing over 700 and 500 m strike lengths and the intervening 1.5 km was tested with four holes. All but one of the holes intersected gold concentrations of over 400 ppb in pyrite-rich iron formation and silicified pyrite-rich zones ad-

***SAMPLING RESULTS, SUSAN CLAIMS (Figure 5-5)***

| Site | Sample # | Type of Sample | Description | Au (ppm) | Ag (ppm) |
|---|---|---|---|---|---|
| a | 20 | grab | Chlorite schist, quartz veinlets, pyrite cubes | 2.16 | 6.31 |
| b | 17 | grab | Quartz veins with pyrite, chalcopyrite, bornite | 6.66 | 10.50 |
| | 60 | chip (0.5 m) | Quartz veins with pyrite, chalcopyrite, bornite | 1.03 | 6.38 |
| c | 16 | grab | Quartz vein with pyrite cubes | 33.95 | 5.49 |
| d | 38 | chip (0.7 m) | Quartz vein with pyrite cubes | 2.58 | 1.05 |
| e | 66 | grab | Quartz vein with pyrite cubes | 436.81 | 77.83 |
| | 35 | chip (0.7 m) | Quartz vein with pyrite cubes | 52.80 | 9.26 |
| | 36 | chip (0.7 m) | Quartz vein with pyrite cubes | 97.72 | 16.12 |
| | 37 | chip (0.7 m) | Quartz vein with pyrite cubes | 1.36 | 0.38 |
| f | 109 | grab | Silicified diorite with minor pyrite | 2.06 | 0.47 |
| | 110 | grab | Quartz vein with pyrite cubes (1 m from 109) | 223.55 | NA |
| | 34 | chip (0.7 m) | Quartz vein with pyrite cubes | 115.20 | 22.63 |
| g | 11 | grab | Andesite with trace pyrite | 1.00 | 0.28 |
| h | 10 | channel (0.6 m) | Andesite with pyrite cubes | 1.48 | 0.45 |
| | 12 | grab | Quartz vein with pyrite cubes | 24.72 | 4.80 |
| | 32 | chip (1.5 m) | Quartz vein with pyrite cubes | 1.20 | 0.7 |
| i | 15 | grab | Quartz vein with galena and chlorite | 137.83 | 31.55 |
| | 29 | grab | Smoky quartz with pyrite and chalcopyrite | 2.40 | 0.87 |
| | 58 | chip (0.6 m) | Quartz vein with pyrite and pyrrhotite | 82.98 | 14.75 |
| j | 13 | grab | Quartz vein in brecciated diorite | 44.58 | 89.15 |
| | 14 | grab | Chloritized and sericitized diorite | 2.03 | 0.42 |
| k | 108 | grab | Quartz vein with pyrite, chalcopyrite and galena | 99.09 | NA |
| m | 8 | channel (2.0 m) | Quartz in chloritized andesite | 0.48 | 1.38 |
| n | 96 | grab | Andesite, possible copper sulphides | 4.98 | 0.9 |
| o | 26 | grab | Quartz vein with minor sulphides | 14.51 | 4.46 |
| p | 7 | grab | Smoky quartz with pyrite and arsenopyrite | 2.40 | 0.76 |
| | 53 | chip (0.5 m) | Gossanous quartz vein with sulphides | 152.92 | 17.15 |
| | 54 | grab | Gossanous quartz vein with sulphides | 29.83 | 4.80 |
| q | 87 | grab | Silicified andesite with pyrite | 0.86 | 0.16 |
| r | 64 | chip (4.0 m) | Quartz vein with altered andesite | 1.72 | 0.45 |
| s | 89 | grab | Andesite in contact with quartz vein | 1.72 | 0.51 |
| | 90 | grab | Quartz vein with inclusions of andesite | 2.06 | 0.33 |
| | 91 | grab | Quartz vein with pyrite | 8.40 | 2.57 |
| | 92 | grab | Altered oxidized brecciated andesite | 48.35 | NA |
| t | 95 | grab | Quartz-calcite vein with sulphides and inclusions of brecciated andesite | 500.58 | NA |
| u | 56 | chip (0.7 m) | Quartz vein | 0.86 | 0.78 |
| v | 24 | grab | Quartz vein with pyrite, minor arsenopyrite and andesite fragments | 27.95 | 6.00 |
| w | 5 | grab | Quartz vein with pyrite | 4.67 | 5.15 |
| x | 6 | grab | Quartz vein with pyrite | 2.64 | 1.58 |
| y | 73 | grab | Massive pyrite in quartz vein | 5.49 | 5.2 |
| z | 77 | channel (0.5 m) | Quartz-calcite vein with pyrite cubes | 1.38 | 0.43 |
| B | 1 | grab | Quartz vein with pyrite, chalcopyrite | 90.52 | 13.72 |
| | 2 | grab | Rusty smoky quartz | 216.01 | 34.98 |
| | 3 | grab | Chloritized andesite | 2.78 | 0.52 |
| | 4 | grab | Smoky quartz with pyrite | 7.00 | 4.91 |
| | 67 | grab | Quartz vein with minor pyrite | 365.00 | 0.22 |
| | 68 | chip (0.3 m) | Rusty smoky quartz with pyrite | 92.58 | 13.72 |
| | 75 | grab | Smoky quartz vein with sulphides | 17.83 | 2.85 |
| | 85 | grab | Smoky quartz vein with sulphides | 172.81 | NA |
| C | 133 | grab | Quartz vein with andesite fragments, chlorite and minor sulphides | 3.26 | 0.48 |
| D | 41 | grab | Sheared rusty andesite with arsenopyrite and pyrite | 4.98 | 1.92 |

jacent to the feldspar porphyry intrusions. The highest concentration detected was 12.1 ppm Au over 1.34 m in a silicified zone.

## HURWITZ PROJECT

Suncor Inc.
500 - Fourth Ave. SW
Calgary, Alta., T20 2V5

Gold
65 B/15,16; G/1-3,6-8
61°10'N, 98°10'W

### REFERENCES

Eade (1973, 1974); Eade and Chandler (1975); Laporte (1984, 1985a).

DIAND assessment reports: 081769, 081805, 081827, 081911, 081947, 081948, 081949, 081950, 082058.

### PROPERTY

The properties held by Suncor Inc. are listed in Figure 5-6.

### LOCATION

The Hurwitz Project area extends from north of Tatinnai Lake to northwest of Griffin Lake (Fig. 5-6).

### HISTORY

Selco Exploration Company Ltd. explored the Cullaton Lake, Mountain Lake and Tatinnai Lake areas in the 1960's and discovered a number of gold showings. One of these showings, the B-Zone Deposit, was brought into production in 1981 by Cullaton Lake Gold Mines Ltd.

Suncor Inc. staked the A to P, BECKY, COR, PETE and ROD claims in 1981 to cover anomalies detected during a 3,560 line km Tridem, magnetic and radiometric survey and a reconnaissance geochemical lake water and sediment survey. Prospecting Permits 826 to 834 and claims 13, A 3-7, DAY, FRI, SPORT, TOO 1-3, WED 1-11 and ZAK 1-4 were acquired in 1982. Prospecting Permits 830 to 834 were relinquished and Prospecting Permit 905 was acquired in 1983. BAR 1-2, DON 1-5, FRANK 1, H 2-3, KEVIN 1-3, MIKE 1-6, PAUL 1-5, RAY 1, SIKSIK and ZAK 5-6 were added to the property in 1983.

Thirty grids were established on geophysical and geochemical anomalies and explored, in 1982 and 1983, with mapping, prospecting, geochemical surveys and magnetic, VLF-EM, MaxMin, HLEM and IP surveys. Nine trenches were dug and 22 holes totalling 1,653 m were drilled on the D Zone, previously explored by Selco Exploration Company Ltd., and other geophysical anomalies. The permits were explored with a lake sediment geochemical survey and a helicopter-borne radiometric survey (Laporte, 1985a).

DEB 1-3, E 2, H 3, J 3-4, JEN 1-6, K 9, RAY 2, ROD 6, SIK 2 and ZAK 5-6 were staked in 1984. Property additions in 1985 were BC 1, DAD 1, KAR 1-5, MIL 1-4, MOM 1, ROD 7 and SIK 3. The JEN claims and most of the claims staked in 1985 cover gold showings north of Tatinnai Lake, which were explored by Hudson Bay Mining and Smelting Company Ltd. and Kasba Explorations Ltd. in the 1940's, drilled by Selco Exploration Company Ltd. in 1966 and 1967 and prospected by Esso Minerals Canada Ltd. in 1981 (Laporte, 1984).

### DESCRIPTION

The focus of exploration is a north-northwest-trending, 25 to 50 km wide belt of Archean Henik Group clastic and volcanic rocks. The clastic component of the Henik Group includes greywacke and slate, metagreywacke, pelitic schist and gold-bearing iron formation. The mafic volcanic flows and pyroclastics that underlie these clastic rocks outcrop at the edges of the belt.

The belt is flanked by basins of Aphebian Hurwitz Group sediments. The western basin is a synform with a slightly arcuate axis trending south to the west of Mountain Lake. The eastern basin,which extends from west of Ducker Lake, consists of number of anticlines and synclines disrupted by east-southeast- and north-northwest-trending faults.

The Hurwitz Group has been divided into six formations, five of which outcrop in the area. Conglomerate and greywacke of the basal Padlei Formation are overlain by orthoquartzite and arkose of the Kinga Formation. These are overlain by slate, shale and siltstone of the Ameto Formation, which are in turn overlain by dolomite, argillite, phyllite and siltstone of the Watterson Formation. The top two units of the Hurwitz Group are the Ducker Formation, which does not outcrop in the area, and the Tavani Formation, an assemblage of arkose and impure quartzite, conglomerate and dolomite (Eade, 1973, 1974; Eade and Chandler, 1975).

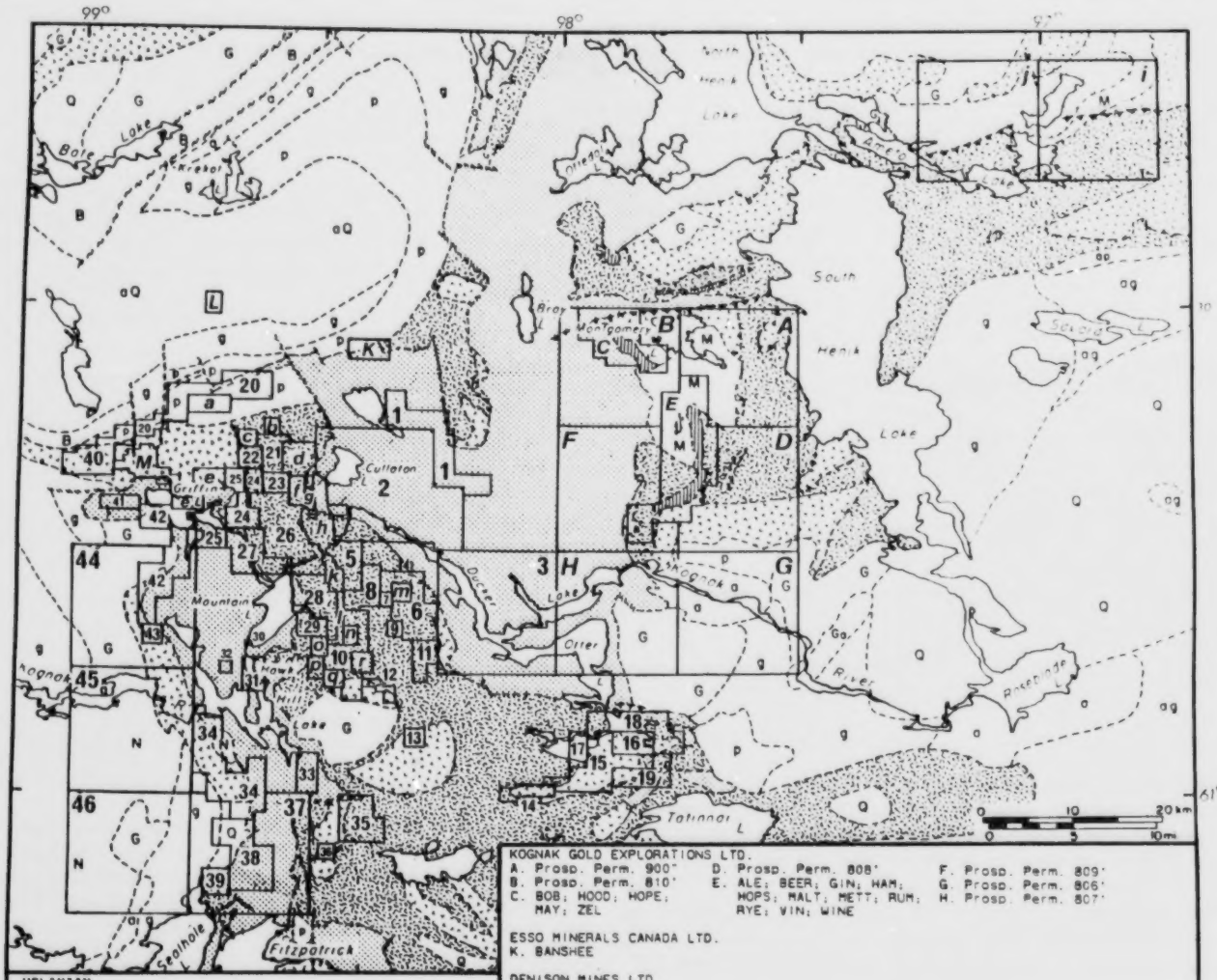
The main target is gold hosted in sulphide-bearing sections or fracture zones in the iron formation, but the showings north of Tatinnai Lake are in shear zones in volcanics. Visible gold is in quartz and quartz-carbonate veins and stringers along the shear planes and in the adjacent biotite-enriched volcanics. Disseminated arsenopyrite, pyrite, pyrrhotite and traces of chalcopyrite are also present in the volcanics. Drilling by Selco Exploration Company Ltd. on the easternmost Gold Island Showing outlined a branching system of three narrow shear zones at least 61 m and up to 165 m long. Samples assayed up to 57.5 ppm Au over 0.46 m. The westernmost Lothrop No. 2 or Lowo Lake Showing is a 45 m long shear zone with an average content of 13.7 ppm Au over 1.8 m (Laporte, 1984).

### CURRENT WORK AND RESULTS

Prospecting Permits 826 and 828 were explored in 1984 with prospecting and, locally, soil sampling. Prospecting Permit 905 was prospected in 1984 and mapped in 1985. Reconnaissance magnetic surveys done in 1984 and a limited soil sampling survey in 1985 failed to detect any anomalies.

A number of geophysical anomalies and geological features on the claims were explored, in 1984, with 520 line km of magnetic and VLF-EM surveys, geological mapping at 1:2500, MaxMin surveys of the better VLF-EM conductors and diamond drilling (26 holes totalling 3690 m; see Table 5-1). The drilling on PAUL 1 and H tested geophysical anomalies caused by quartz-chlorite alteration zones containing pyrite, pyrrhotite, magnetite and up to 16.6 ppm Au over 0.56 m. Two holes on the D Zone tested the iron formation and 2 holes tested a fault zone. The other holes probed fault zones, geophysical anomalies, iron formation and, on PETE 6, a quartz pebble conglomerate but failed to detect gold concentrations of interest.

Further geological, geophysical and geochemical surveys were done in 1985 and 4256.9 m were drilled in 35 holes (Table 5-1). The main drill targets were the alteration zones on PAUL 1




HELIKIAN

N : Nueltin Lake porphyritic granite

APHEBIAN

aQ: Quartz monzonite
ag: Layered gneiss, gneissic granodiorite
ap: Paragneiss, migmatised paragneiss

B : BATE LAKE SEDIMENTS: dolomite, phyllite, arkose, siltstone, paragneiss

HURWITZ GROUP: orthoquartzite, greywacke, conglomerate, arkose, dolomite, siltstone, argillite

M : MONTGOMERY LAKE GROUP: siltstone, arkosic quartzite, greywacke, conglomerate

ARCHEAN

Ga: Gabbro
Q : Quartz monzonite
G : Granodiorite, massive to foliated
g : Quartzo-feldspathic gneiss, granodioritic gneiss, layered gneiss

HENIK GROUP:
p: Paragneiss, pelitic gneiss
Greywacke, slate, minor iron formation and volcanic flows
Iron formation
a: Amphibolite, melanocratic gneiss
Mafic to felsic volcanic flows and pyroclastics, arenites, ultrabasic flows

KOGNAK GOLD EXPLORATIONS LTD.
A. Prosp. Perm. 900'
B. Prosp. Perm. 810'
C. BOB; HOOD; HOPE; MAY; ZEL
D. Prosp. Perm. 808'
E. ALE; BEER; GIN; HAM; HOPS; MALT; METT; RUM; RYE; VIN; WINE
F. Prosp. Perm. 809'
G. Prosp. Perm. 806'
H. Prosp. Perm. 807'

ESSO MINERALS CANADA LTD.
K. BANSHEE

DENISON MINES LTD.
L. RICH 1-16

NORANDA EXPLORATION COMPANY LTD.
M. GRIF 1; ROY 1-31; STRIDER 1-74'

CULLATON LAKE GOLD MINES LTD.
Cullaton Lake Project
a. DOVE
b. PAGE
c. CHAS
d. COD; DOC; HAL; SOC
e. ERIN; MEL
f. BO
g. FOX; HUGH; LEW
j. BEA
k. BPB; PEN 3-31
l. JOHN; KAREN; MARIE; MICK; RITA
m. SUN
n. JUDY
o. NOBE
p. RON
q. SHAW
r. LYNNE
B-Zone Gold Deposit
h. AIR 1-12; CEP; CORNER; DWE 1-17; GILT 1-15, 17-22, 25-29; MAC; MIK 3-5, 11-13; SUE; TAIL
Ameto Lake Project
i. Prosp. Perm. 1023
j. Prosp. Perm. 1024

SUNCOR INC.
1. MIKE 1-6"
2. COR 1-19"
3. Prosp. Perm. 905
4. FRANK
5. KEVIN 1-3
6. PAUL 1-5
7. H
8. H 2-3
9. G
10. ZAK 1-5
11. E; E2
12. DAY; FRI; 13
13. WED 11
14. BAR 1-2
15. JEN 1-6
16. DEB 1-3
17. DAD; MOM
18. BC 1; MIL 1-4
19. KAR 1-5
20. A 1-7
21. RAY 1-2
22. WED 4
23. SPORT
24. TOO 1-3
25. DON 1-5; 0
26. PETE 1-5
27. WED 5-6, 8
28. WED 7, 9-10
29. PETE 6; ZAK 6
30. BECKY
31. L 1
32. L 2"
33. C 1-2"
34. K 1-9"
35. B 1-3
36. B 4"
37. Prosp. Perm. 826'
38. J 1-4"
39. D
40. WED 103; SIK 2-3; SIKSIK
41. P"
42. ROD 1-7'
43. H
44. Prosp. Perm. 828'
45. Prosp. Perm. 829'
46. Prosp. Perm. 827'

' Partly or totally lapsed in 1984
" Partly or totally lapsed in 1985

*FIGURE 5-6: Geology and properties, Kognak River area (geology from Eade, 1981a).*

***TABLE 5-1 Hurwitz Project Ground Surveys done in 1984 (o) and 1985 (x)***

| CLAIMS | GRIDDING (line km) | MAP | PROSPECT | SOIL SAMPLING | BOULDER SAMPLING | MAGNETOMETER | VLF-EM | MAXMIN EM | DRILLING (no./total m) |
|---|---|---|---|---|---|---|---|---|---|
| B 1 | | o | | | | o | o | | o 2/269.8 |
| B 1, 2 | o (6.5) | o | | | | o | o | | o 1/139.4 |
| BAR 2 | o | | o | o | | x | x | o | |
| COR 4, MIKE 1,2 | ox (18.2+) | | | o | | ox | ox | | |
| COR 8 | ox (20.7) | o | | | | o | o | | |
| COR 14* | o (22.5) | | | | | ox | ox | o | |
| BC 1, DEB 1-3, JEN 2-6* (Tatinnai L.) | ox | ox | ox | o | | | | ox | o 2/373.1 x 23/2600.8 |
| E E 2 | o (34.7) | o | | o | | o | o | | |
| G | o (2.6) | o | | | | o | o | o | |
| H | | | | o | o | o | | | o 1/145.4 |
| K 3 | | | | | o | | | | |
| K 4-6 | o (37.8) | o | | | | | | | |
| K 8* | x | x | x | x | | o | o | | |
| KEVIN 1, 2, H 3 | o (30.2) | o | | | | o | o | | |
| L 1* | o (34.8) | | | o | | | | | x 2/369.4 |
| O, TOO 3, DON 1-3 | | | | o | | o | o | o | o 7/903.1 |
| PAUL 1, H* | o (26.3) | o | | | | | | | x 8/1006.5 |
| PAUL 2, FRANK* | o (25.5) | o | | | | o | o | o | |
| PETE 1, TOO 1-3 (D Zone) | o (174.6) | o | | o | | | | | o 4/621.8 x 2/370.6 |
| PETE 3 | | | | | | | | | o 1/224.3 |
| PETE 5, WED 10 | o (5.5) | o | | | | o | o | | |
| PETE 6 | | | | | | o | o | | o 3/410.9 |
| RAY 1* | o (8.1) | o | | | | x | x | | |
| ROD 3, 4* | x (26.0) | x | | | | ox | ox | | |
| SIKSIK, SIK 2,3, WED 3* | ox (31.2) | x | | x | x | | | o | |
| TOO 1, WED 4, DON 1 (D Zone North) | o (62.5) | | | | | | | | |
| WED 7, 10 | o (13.0) | o | | | | o | o | | |
| WED 11* | o (32.4) | o | | | | o | o | | o 2/360.3 |
| ZAK 1 | o (12.3) | o | | | | o | o | o | o 2/247.8 |
| ZAK 3* | o (22.4) | o | | | | | | o | |

* new grids/areas

and H and the gold showings north of Tatinnai Lake. The Tatinnai Lake area was explored with 1:2500 geological mapping, prospecting and 238.8 km of magnetic, 222.9 km of VLF-EM and 10.4 km of MaxMin HLEM surveys. Of the 23 holes drilled, 13 probed the Lowo Lake Showing and 7 probed the Gold Island Showing, and nearby EM conductors. The other three holes tested geophysical conductors between the two showings and failed to detect any gold concentrations (Table 5-2).

## CULLATON LAKE PROJECT

Royex Gold Mining Corporation
1710-141 Adelaide St. W
Toronto, Ont., M5H 3L5

Gold
65 G/1,2,7,8
61°13'N, 98°30'W

### REFERENCES

Eade (1974); Laporte (1983b, 1984, 1985a).
DIAND assessment reports: 081843, 081844, 081846, 081847.

### PROPERTY

The claims, held by Royex Gold Mining Corporation, forming part of the Cullaton Lake Project are listed in Figure 5-6.

### LOCATION

The claims are near the B-Zone Gold Deposit, west of Cullaton Lake and east of Mountain Lake (Fig. 5-6).

### HISTORY

The Cullaton Lake area was first staked by Selco Exploration Company Ltd. who, from 1961 to 1967, explored a number of gold showings with prospecting, geological and geophysical surveys, boulder and soil sampling, diamond drilling and trenching. Most of the claims listed in Figure 5-6 were staked for O'Brien Energy and Resources Ltd. in 1978 to cover anomalies detected by an EM and magnetic survey flown in 1977. Magnetometer, self potential and boulder sampling surveys, done on the claims in 1979 and 1980, indicated the presence of gold-bearing iron formation on most of the claims. The PEN claims were drilled by Cominco Ltd. in 1979, but no economic concentrations of gold were outlined (Laporte, 1983b, 1984).

Cullaton Lake Gold Mines Ltd. acquired the claims in 1980. BEA, DOVE, HUGH and LEW were recorded in 1981, BPB and MAC in 1982 and DOC, SOC and HAL in 1983. The ERIN claim was staked in 1984.

Grids established on the BEA, BO, CHAS, COD, DOVE, FOX, JUDY, LYNNE, NOBE, PAGE, RON and SHAW claims in 1983 were explored with geological mapping and prospecting, boulder sampling, magnetic, MaxMin and/or VLF-EM surveys. Ten anomalies were drilled (Laporte, 1985a).

Cullaton Lake Gold Mines Ltd. and Royex Sturgex Mining Ltd. merged in May 1984 to form Royex Gold Mining Corporation.

### DESCRIPTION

The claims are underlain by greywacke, argillite, phyllite, tuff and magnetic iron formation of the Archean Henik Group. These are overlain, south and west of Cullaton Lake, by in-

***TABLE 5-2 Results of Diamond Drilling by Suncor Inc. in the Tatinnai Lake Area***

| HOLE No. | LOCATION | DIP | CORE SAMPLES Top of intersection (m) | Au (ppm) | Length (m) | SLUDGE SAMPLES Top of intersection (m) | Au (ppm) | Length (m) |
|---|---|---|---|---|---|---|---|---|
| GOLD ISLAND SHOWING | | | | | | | | |
| 85-DB-11 | 3+75S 23+55E | -45 | | N/A | | 5.19 | 0.2 | 6.10 |
| | | | | N/A | | 29.59 | 0.7 | 3.05 |
| | | | 49.88 | 0.2 | 0.59 | 47.80 | 0.5 | 6.10 |
| | | | 64.77 | 2.0 | 2.78 | 60.09 | 0.4 | 9.14 |
| | | | 83.27 | 0.4 | 1.83 | 84.49 | 0.9 | 9.14 |
| | | | 87.41 | 0.2 | 3.12 | | | |
| | | | 99.94 | 0.5 | 0.41 | | Trace | |
| 85-DB-10 | 3+86S 22+50E | -45 | 21.61 | 0.3 | 0.40 | | Trace | |
| | | | 31.89 | 0.2 | 0.62 | 32.64 | 2.1 | 3.05 |
| | | | 70.47 | 8.7 | 1.77 | 69.24 | 2.1 | 15.24 |
| | | | 77.00 | 1.7 | 3.09 | | | |
| | | | 112.69 | 0.8 | 4.74 | 111.94 | 0.9 | 9.14 |
| | | | 129.38 | 3.7 | 0.55 | 127.19 | 0.1 | 15.24 |
| 85-DB-21 | 3+55S 21+33E | -45 | | core not split | | 8.24 | 0.3 | 3.05 |
| | | | | core not split | | 17.39 | 0.4 | 9.14 |
| | | | | core not split | | 35.69 | 1.3 | 6.10 |
| 85-DB-22 | 3+55S 21+32.82E | -48 | | Trace | | | not analysed | |
| 85-DB-23 | 3+24S 19+25E | -45 | 53.70 | 0.8 | 0.78 | | not analysed | |
| 85-DB-12 | 3+75S 17+00E | -45 | 35.58 | 1.3 | 1.31 | 32.64 | 3.8 | 27.43 |
| | | | 44.80 | 0.8 | 4.74 | | | |
| | | | 75.29 | 0.9 | 2.94 | 75.34 | 3.5 | 3.05 |
| | | | 93.57 | 1.0 | 4.63 | 90.59 | 0.5 | 12.19 |
| | | | 113.07 | 0.2 | 4.89 | 111.94 | 1.4 | 12.19 |
| 85-DB-20 | 4+30S 16+00E | -45 | 35.33 | 0.8 | 3.46 | 32.64 | 0.9 | 18.29 |
| | | | 69.19 | Trace | | 69.24 | 0.1 | 9.14 |
| | | | | core not split | | 81.44 | 0.3 | 15.24 |
| | | | 118.27 | 12.7 | 2.89 | 118.04 | 5.9 | 9.14 |
| | | | 140.94 | 17.5 | 1.19 | 142.44 | 2.6 | 3.05 |
| | | | 157.84 | 19.5 | 0.35 | 157.69 | 0.4 | 27.43 |
| | | | 174.59 | 1.0 | 2.01 | 185.14 | Trace | |
| | | | | core not split | | 188.19 | 0.2 | 15.24 |
| AREA BETWEEN SHOWINGS | | | | | | | | |
| 85-DB-13 | 0+50S 13+50E | -45 | | Trace | | | Trace | |
| 85-DB-14 | 1+00N 10+00E | 45 | | Trace | | | Trace | |
| 85-DB-15 | 0+75S 6+50E | -45 | | Trace | | | Trace | |
| LOWO LAKE SHOWING | | | | | | | | |
| 85-DB-19 | 1+25S 3+00E | 45 | 13.49 | 2.0 | 1.13 | | Trace | |
| | | | 26.76 | 2.0 | 1.20 | | Trace | |
| | | | | core not split | | 66.19 | 0.5 | 3.05 |
| | | | 81.80 | 6.1 | 0.20 | | Trace | |
| | | | 82.48 | 5.2 | 0.24 | 78.39 | 0.4 | 9.14 |
| | | | 83.37 | 4.7 | 0.59 | | Trace | |
| | | | | core not split | | 118.04 | 1.2 | 9.14 |
| 85-DB-18 | 0+90S 1+00E | -45 | 17.37 | Trace | | 17.39 | 0.2 | 12.19 |
| | | | 78.33 | Trace | | 78.39 | 0.4 | 3.05 |
| | | | 83.55 | 2.0 | 0.88 | | Trace | |
| 85-DB-9 | 1+60S 1+00E | -45 | 9.13 | 8.2 | 0.59 | 7.32 | 7.0 | 3.96 |
| 85-DB-3 | 0+10S 0+25W | -45 | 9.20 | 1.5 | 3.02 | 8.24 | 4.9 | 6.10 |
| 85-DB-3A | 0+10S 0+25W | -65 | 14.53 | 68.3 | 2.53 | | no recovery | |
| 85-DB-3B | 0+10S 0+25W | -90 | | no intersection | | | | |
| 85-DB-4 | 0+50S 0+25W | -45 | 36.51 | 7.5 | 1.35 | 35.69 | 2.6 | 3.05 |
| | | | 55.46 | 5.1 | 0.15 | | no recovery | |
| 85-DB-5 | 0+41S 0+25W | -45 | 31.17 | 2.4 | 1.83 | 29.59 | 14.0 | 12.19 |
| | | | 33.63 | 8.7 | 1.68 | | no recovery | |
| 85-DB-16 | 1+00S 0+75W | -45 | 37.18 | 11.3 | 3.44 | 35.69 | 4.5 | 6.09 |
| | | | 48.65 | 1.6 | 1.81 | 41.79 | 0.4 | 18.28 |
| | | | | core not split | | 72.29 | 0.4 | 6.09 |
| | | | | core not split | | 81.44 | 0.2 | 6.09 |
| | | | | core not split | | 151.59 | 0.2 | 9.14 |
| 85-DB-6 | 0+10S 1+25W | -65 | | no intersection | | | | |
| 85-DB-17 | 1+00S 1+75W | -45 | 98.79 | 4.4 | 0.99 | | Trace | |
| 85-DB-7 | 0+50S 2+25W | -45 | 46.88 | 0.9 | 2.69 | 17.39 | 0.4 | 12.19 |
| 85-DB-8 | 0+50S 3+25W | -45 | 21.97 | 0.7 | 0.31 | 20.44 | 0.9 | 3.05 |
| | | | 43.48 | 0.1 | 0.85 | 41.79 | 1.0 | 3.05 |

tensely fractured orthoquartzite and slate of the Aphebian Hurwitz Group (Eade, 1974). Gold is in sulphide-bearing sections of the Archean iron formation and in sulphide-bearing fractures in the orthoquartzite.

### CURRENT WORK AND RESULTS

Numerous grids were established on the claims and explored with magnetic, MaxMin, VLF-EM and locally, IP surveys, geological mapping and reverse circulation overburden drilling. Conductive sections of the iron formation layers and some of the VLF-EM conductors in orthoquartzite were probed with 109 diamond drill holes totalling 15,180 m. Gold concentrations were encountered in some holes.

## AMETO LAKE PROJECT

Royex Gold Mining Corporation
1710-141 Adelaide St. W.
Toronto, Ont., M5H 3L5

Gold
65 H/10,11
61°42'N, 97°00'W

### REFERENCES

Bell (1970, 1971); Eade (1974); Laporte (1974a, 1983b, 1984).
DIAND assessment report: 081810.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1023 | 65 H/10 NW |
| Prospecting Permit 1024 | 65 H/11 NE |

### LOCATION

The property extends north and east of Ameto Lake (Fig. 5-6).

### HISTORY

Kasba Explorations Ltd. prospected the area in 1948 and discovered a minor gold showing in conglomerate north of Ameto Lake. Selco Exploration Company Ltd. staked the CABIN claims, northeast of Ameto Lake, in late 1960, to cover a gold-bearing pyritic conglomerate horizon. Prospecting Permits 15 and 16, covering NTS areas 65 H/10 and 11, were acquired in 1961. Twenty-one AX holes, totalling 1,136.7 m, and eight X-ray holes, totalling 102.1 m, tested a 4 km length of the conglomerate bed. The conglomerate contained persistent but uneconomic gold concentrations ranging up to 4.7 ppm Au.

Part of the area of Prospecting Permit 1024 was staked for Atlantic Richfield Company in 1969 (Laporte, 1974a). Airborne geophysical surveys and reconnaissance geological work in 1969 outlined numerous anomalies which were explored in 1970 using geochemical lake water and soil surveys and airborne and ground radiometic surveys.

Prospecting Permit 572, covering NTS area 65 H/11 NE, was acquired by Dual Resources Ltd. in 1979 and subsequently optioned by Esso Minerals Canada Ltd. (Laporte, 1983b, 1984). A 110 line km helicopter-borne radiometric survey, reconnaissance lake water and sediment survey, soil survey and prospecting done in 1980 outlined two areas of interest. Re-evaluation of these areas in 1981 indicated they were too small to warrant further work.

Prospecting Permit 1023 and 1024 were granted to Cullaton Lake Gold Mines Ltd. on February 1984. In May 1984, Cullaton Lake Gold Mines Ltd. merged with Royex Sturgex Mining Ltd. to form Royex Gold Mining Corporation.

### DESCRIPTION

Volcanic rocks of the Archean Henik Group underlie the northern and eastern parts of the property. The southern part of the permits is underlain by greywacke and discontinuous iron formation, also of the Henik Group. The contact between these two lithologies is covered, in the central and western parts of the area, by an arcuate basin of younger sediments (Eade, 1974).

Northeast of Ameto Lake, the Henik Group rocks are overlain by the Aphebian Montgomery Lake Sediments, arenite and conglomerate. These define the eastern edge of the basin and are overlain by Hurwitz Group rocks including conglomerates of the Padlei Formation, orthoquartzite of the Kinga Formation and siltstone, argillite and gabbro sills of the Ameto Formation. North of Ameto Lake, the Henik Group greywackes are thrust over the Kinga Formation orthoquartzites along the southern margin of the basin (Bell, 1970, 1971).

Archean granodiorite intrudes the volcanics in the northwest corner of the property.

### CURRENT WORK AND RESULTS

Those parts of the property underlain by quartzite were mapped and prospected. Of the 134 samples collected, only three contained more than 3.4 ppm Au. Two were from quartz veins and one from a quartz breccia.

## SY PROJECT

Abermin Corporation
1700-1075 West Georgia St.
Vancouver, B.C., V6E 3C9

Gold
65 I/4-6
62°22'N, 97°37'W

### REFERENCES

Eade (1986); Laporte (1974a,b).
DIAND assessment reports: 081828, 081984.

### PROPERTY

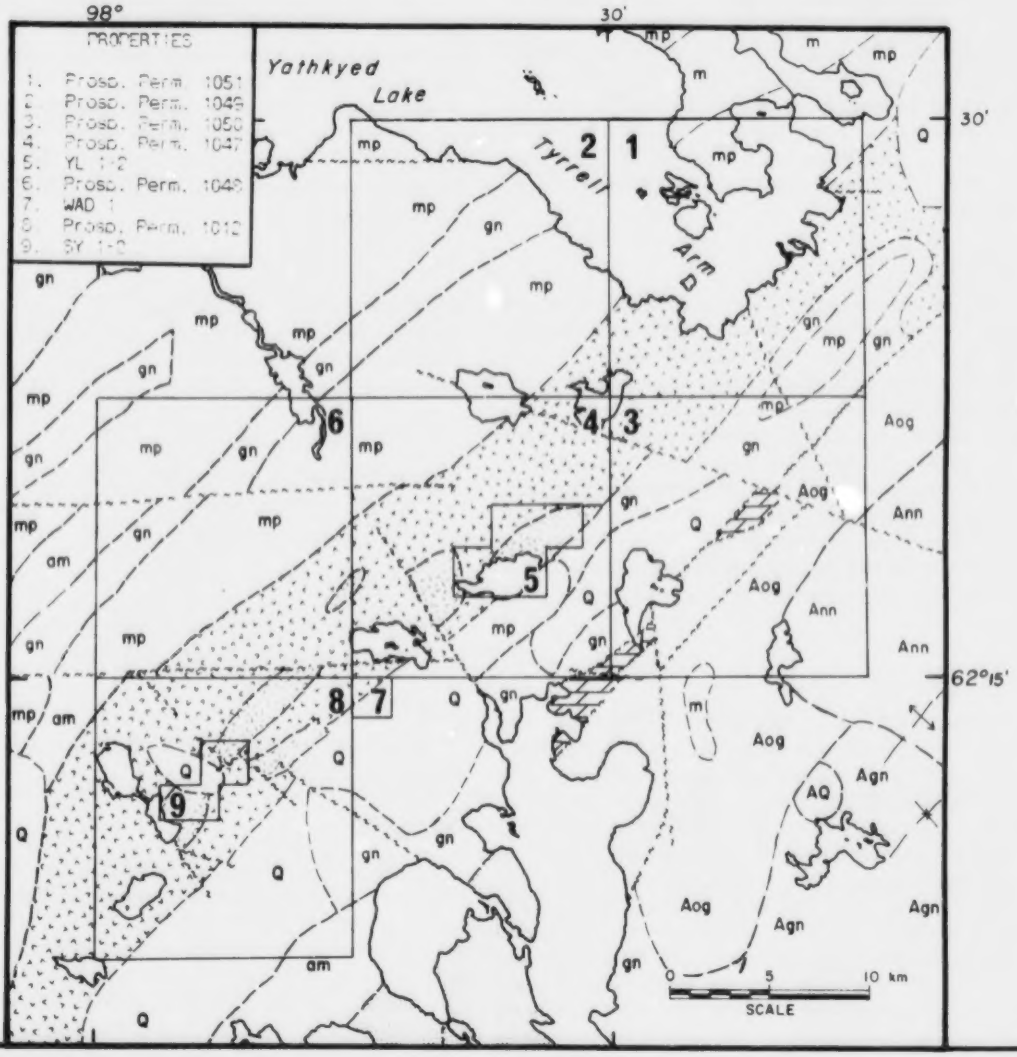
The five claims and six prospecting permits explored are listed in Figure 5-7.

### LOCATION

The project area extends southwest from Tyrrell Arm of Yathkyed Lake to northwest of Imikula Lake (Fig. 5-7).

### HISTORY

Prudhoe Bay Oils Ltd. held NTS area 65 I/4 as Prospecting Permit 176 from 1969 to 1972. A photogeological and aeromagnetic study of the area delineated five zones of interest that were investigated with ground geological and geophysical surveys in 1970 and 1971. A gossan zone was trenched and samples of volcanic rock containing disseminated pyrite, pyrrhotite and chalcopyrite were collected. The rock contained




APHEBIAN

AQ Quartz monzonite, granite, in part porphyritic; minor syenite, granodiorite and quartz diorite

Aog Orthogneiss, largely biotite quartz-monzonite gneiss with potassium feldspar porphyroblasts; cut by up to 15 per cent dykes and stringers of quartz monzonite and granite pegmatite

Ann Nebulitic and swirled gneiss, in part irregularly layered, predominantly biotite-bearing; contains abundant potassium feldspar porphyroblasts and 20 to 25 per cent quartz monzonite

Agn Layered gneiss to irregularly layered gneiss and agmatite, biotite and hornblende-bearing; some migmatized paragneiss; contains up to 50 per cent dykes, stringers and irregular masses of quartz monzonite

HURWITZ GROUP

TAVANI FORMATION: arkose, meta-arkose, impure quartzite, mica schists

WATTERSON FORMATION: dolomite, phyllite, argillite; and KINGA FORMATION: orthoquartzite

ARCHEAN

Q Quartz monzonite to granodiorite, massive to slightly foliated

gn Granodiorite gneiss, tonalite gneiss and quartz diorite gneiss; includes some orthogneiss, layered gneiss, swirled to nebulitic gneiss and amphibolite inclusions; minor quartz monzonite veins

m Migmatite to irregularly layered, banded, or nebulitic gneiss; minor agmatite; commonly cut by dykes and sheets of quartz monzonite or pegmatite

HENIK GROUP

mp Migmatized paragneiss, amphibolite and granodiorite gneiss

am Predominantly amphibolite; minor amphibolitic greenstone, amphibole schist and gneiss

Intermediate to felsic metavolcanics; tuff, agglomerate, and flows

Basic metavolcanics; massive or pillowed basaltic and andesite flows, pyroclastics, tuff, and agglomerate; minor gabbro and intermediate to felsic flows and tuffs

*FIGURE 5-7: Geology and properties, Yathkyed Lake area (geology from Eade, 1986).*

up to 0.06% Cu. Eighteen K claims were staked when the permit lapsed and were transferred to Columbian Northland Exploration Ltd. (Laporte, 1974a,b).

Aberford Resources Ltd. became interested in the Imikula Lake area in 1981 as a result of a six-week prospecting campaign. Interesting prospects were staked as the SY 1 and 2 claims in 1983 and Prospecting Permit 1012 was acquired in 1984. The remaining properties were acquired in 1985. The mineral assets of Aberford Resources were transferred to Abermin Corporation in late 1985.

### DESCRIPTION

The focus of exploration of the SY Project is an 8 to 10 km wide northeast-trending belt of massive to pillowed basaltic and andesitic flows of the Archean Henik Group. The mafic volcanic rocks enclose intermediate to felsic tuff, agglomerate and flows and chert-magnetite and chert-pyrite iron formation.

To the north and southeast, the volcanic rocks are intruded by quartz monzonite. To the west, they are in contact with migmatized amphibolite. Granodiorite and tonalite gneiss and migmatized paragneiss outcrop along the eastern edge of the belt south of Tyrrell Arm. Hurwitz Group Tavani Formation arkose, meta-arkose, impure quartzite and mica schists overlie the quartz monzonite in the centre of Prospecting Permit 1050 (Eade, 1986).

### CURRENT WORK AND RESULTS

The reconnaissance work in 1981 and 1983 indicated that quartz-sulphide iron formation in the SY claims area contained up to 7.1 ppm Au, 4.1 ppm Ag and 2.4% Zn. In 1984, the claim block and surrounding prospecting permit were mapped at 1:5000 and extensively prospected. During these surveys, 376 rock samples were collected and 115 samples from frost boils and trenches were panned. Two grids totalling 79.7 line km were established in the SY claims and explored with VLF-EM and magnetic surveys. Three mini-grids of more closely spaced lines were established in areas of anomalous frost boils and explored with VLF-EM, magnetic and soil geochemical surveys.

An exploration program similar to the 1984 work was done on the newly acquired properties in 1985. It involved mapping and extensive prospecting, with the collection of 329 rock samples and 150 panned concentrates, magnetic and VLF-EM surveys of a grid on the YL claims and geophysical and geochemical surveys on three new mini-grids.

Approximately 20 areas with anomalous gold concentrations were detected over a 32 km length of the volcanic belt. The gold-bearing zones are 0.6 to 4 m wide and contain up to 26 ppm Au. These zones are in cataclastically disrupted segments of the oxide-silicate iron formation and are associated with arsenopyrite, pyrite and pyrrhotite. Narrow VLF-EM conductors with sharp crossovers are associated with the showings.

## BAKER LAKE-THELON RIVER AREA

The Baker Lake-Thelon River area is underlain by a complex of gneisses and gneissic to massive granitic intrusions enclosing Archean supracrustal belts near Yathkyed Lake and Baker Lake. Late Aphebian to early Helikian shallow-dipping conglomerates, arkosic sandstone and mudstone, intruded by syenitic bodies and overlain by intermediate to felsic volcanic flows and pyroclastics, cover the basement complex south and southwest of Baker Lake. Flat-lying quartzose conglomerates and sandstones of Paleohelikian age overlie the basement complex in the Thelon River area.

Exploration in the area was for uranium in the basement complex, in Aphebian sediments of the Amer Group and in late Aphebian to early Helikian Dubawnt Group sediments and volcanics. The supracrustal belt north of Baker Lake was explored for gold.

## SHANE LAKE PROJECT

Noranda Exploration Co. Ltd.
2130 Notre Dame Ave.
Winnipeg, Man., R3H OK1

Uranium
55 M/11,14,15
63°50'N, 95°02'W

### REFERENCES

Blake (1980); Laporte (1983b, 1984, 1985a); LeCheminant and others (1976, 1977); Reinhardt and others (1980).

DIAND assessment report: 081903.

### PROPERTY

Figure 5-8 lists the claims held by Noranda Exploration Company Ltd. in the Bissett Lake area.

### LOCATION

The property extends southwest from Christopher Island to east of Kazan Falls (Fig. 5-8).

### HISTORY

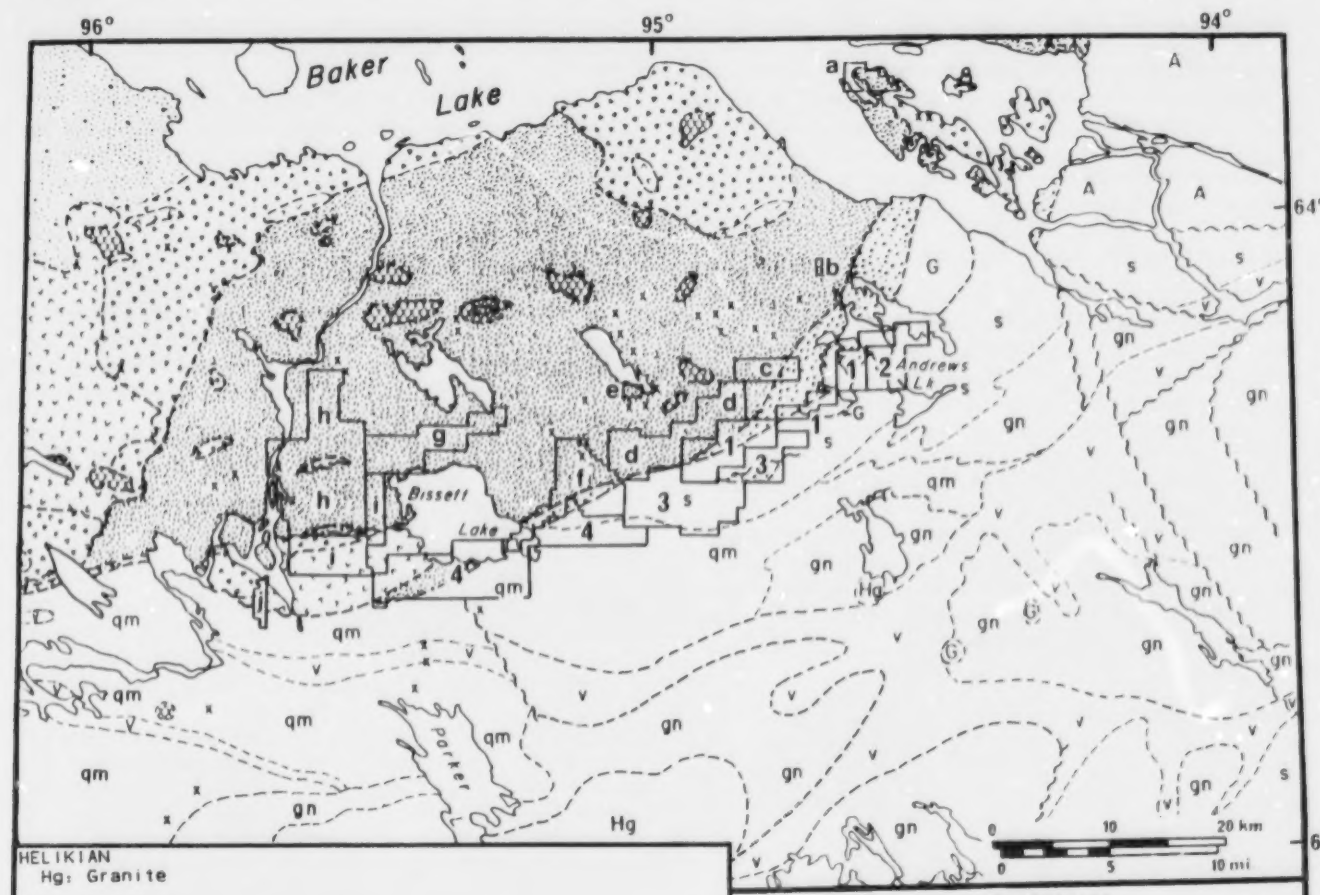
VASO 1-12 were staked in 1978 and A 1-2, MS 1-17 and V 1-14 in 1979. The claims cover ground previously explored as part of the TMT Project by Pan Ocean Oil Ltd. and its precursors between 1969 and 1976. From 1979 to 1981, the property was explored with INPUT surveys, ground geophysical and geochemical surveys, mapping, prospecting and diamond drilling. Holes totalling 846.88 m were drilled on the VASO (8 holes), V (5 holes) and MS claims (3 holes) in 1980 but failed to intersect economic concentrations of uranium. Sixteen more holes totalling 1,217 m were drilled on MS 14 and 15 in 1982 (Laporte, 1983b, 1984, 1985a).

By 1984, two A, seven MS, five V and four VASO claims had lapsed and the area of MS 1,3-5 and VASO 5-10 had been reduced.

### DESCRIPTION

The claims cover the unconformity along the eastern and southern edges of the Baker Lake Basin. Dubawnt Group South Channel Formation conglomerate and Kazan Formation arkose outcrop in the western and northern parts of the claim group and overlie Archean and/or Aphebian layered gneiss, gneissic intrusions and metavolcanic and metasedimentary belts (Blake, 1980; LeCheminant and others, 1976, 1977; Reinhardt and others, 1980).

The 1979 and 1981 geophysical surveys outlined 15 conductive zones on the MS, V and VASO claims. The 1980 drilling indicated that conductors on the V and VASO claims are




HELIKIAN
Hg: Granite

DUBAWNT GROUP
Thelon Fm.: sandstone, pebbly sandstone, conglomerate
Martell Syenite: syenite, porphyrytic microsyenite, minor monzonite
Christopher Island Fm.: mafic trachyte flows, minor tephra
: volcaniclastic sandstone, siltstone, mudstone, conglomerate, minor tephra
Kazan Fm.: arkose, minor pebbly arkose, conglomerate, siltstone
South Channel Fm.: polymictic conglomerate, sandstone lenses

APHEBIAN AND ARCHEAN
gn: Layered and lit par lit gneiss, migmatite, gneissic granodiorite with inclusions

ARCHEAN
A: Kramanituar High Grade Complex: anorthosite, granulite
qm: Foliated quartz monzonite
s: Greywacke and slate; derived schists and gneisses
v: Volcanic rocks; derived schists and gneisses

PROPERTIES

ABERMIN CORPORATION
a. 50 BL (2-72)
b. D 100-102*
c. D 297-348*°
d. RYAN 6-7,9-12*
e. C 200-205
f. A 1-8; C 34-199
g. C 30-33; PITA 1-150
h. B 1-351,364-370,449-450
K 231-264*
i. BIS 11,21,23,25-27,33*°
j. BIS 32*

NORANDA EXPLORATION COMPANY LTD.
1. VASO 5-12°
2. V 1,2,4
3. V 6-14
4. MS 1,3-8,13-15°

*partly or totally lapsed in 1984
°partly or totally lapsed in 1985

*FIGURE 5-8: Geology and properties, Bissett Lake area (geology from Blake, 1980; Eade, 1981b and Reinhardt and others, 1980).*

caused by barren graphitic chloritic tuffs and metavolcanics of the basement complex (Laporte, 1984a).

The 1982 drilling on the MS claims outlined uranium, copper and silver concentrations in fractured South Channel Formation conglomerate, regolith overlying the basement, and graphitic metasediments of the basement complex. The graphitic metasediments contained up to 2% Cu and 93.6 ppm Ag (Laporte, 1985a).

### CURRENT WORK AND RESULTS

Diamond drilling of conductors with coincident Track Etch anomalies resumed on the MS claims in 1984. Three vertical holes totalling 203 m were drilled on MS 3-5 and five vertical holes totalling 291 m were drilled in the vicinity of the metal concentrations on MS 14 and 15. Two of the three holes on the western grid penetrated the basement complex and encountered barren graphitic metasediments. The third hole, 1 km to the west, was stopped in Kazan Formation arkose at 103 m depth.

Of the five holes on the eastern grid, four intersected minor fracture related uranium concentrations in the Dubawnt Group rocks and basement complex. The highest concentration was 0.366% $U_3O_8$ over 0.5 m in a breccia zone in basement complex metasediments.

## TEHEK LAKE PROJECT

Comaplex Resources Internat'l Ltd.
901, 1015 Fourth St. SW
Calgary, Alta., T2R 1J4

Gold
65 D,E; 66 A,H
65°05'N, 95°10'W

### REFERENCES

Ashton (1981, 1982); Donaldson (1966); Nadeau (1981); Laporte (1985b); Patterson and LeCheminant(1985); Tella (1984).

DIAND assessment report: 081938.

### PROPERTY

The properties are listed in Figure 5-9.

### LOCATION

The properties are west and north of Tehek Lake (Fig. 5-9).

### HISTORY

MOON 1-2 were staked during a reconnaissance prospecting program in 1983. Prospecting Permit 1077 was acquired in early 1985 and the other claims added to the property in December 1985.

### DESCRIPTION

A belt of greywacke, schist, phyllite and argillite trending northeast from the Thelon River extends northwest of Tehek Lake where it is mapped as the Woodburn Lake Group. A slate unit outcropping north of Tehek Lake is probably the stratigraphic equivalent of the greywacke (Donaldson, 1966; Patterson and Le Cheminant, 1985; Tella, 1984).

The Woodburn Lake Group consists of an older sequence of felsic tuffs and rhyolites that grades upward into spinifex-textured ultramafic lavas, felsic to intermediate metavolcanic rocks, banded iron formation and greywacke (Ashton, 1981, 1982).

The stratigraphic position of the white quartzite, which outcrops locally, is poorly understood. Ashton (1982) indicates that the quartzite could be klippens tectonically emplaced from some distance away or could be older or younger than the volcanics.

Extensive layers of iron formation outcrop within the greywacke/slate package in proximity to the volcanic sequence. The iron formation, ranging in composition from quartz-magnetite to quartz-hematite, is often contorted and associated with pyritiferous black slate. In the vicinity of intrusions, the iron formation is metamorphosed to banded and contorted amphibolite and the adjacent slate is metamorphosed to biotite-garnet schist.

Southeast of and in the northwest part of Tehek Lake, the supracrustals are locally altered to biotite-bearing gneisses of the Quoich River Complex. The supracrustals and gneisses are intruded by an Archean granodiorite, north of Tehek Lake, and by the granites of the Tehek Plutonic Complex to the east. Smaller gabbroic and ultramafic plutons outcrop in association with the volcanics northwest of Tehek Lake. Some of these are related to the ultramafic flows and others are younger than the Tehek complex. Syenitic and granitic bodies intruded the plutonic complex and supracrustals in Aphebian times.

A lithogeochemical study of the gold potential of the area undertaken by the author in 1985 outlined five areas of interest in the vicinity of Tehek Lake. Iron formation and gossan samples collected from these areas contained up to 394 ppb Au and one sample of quartz-pyrite veined volcanic rock contained 754 ppb Au (Laporte, 1985b). Sixteen samples were collected from the MOON claims by the author in 1985. The results of this work are presented in Figure 5-10.

### CURRENT WORK AND RESULTS

Reconnaissance mapping and prospecting of Prospecting Permit 1077 led to the discovery of four showings within a 1.6 km radius of one another. The Tazin showing is a 2 m wide and 50 m long massive sulphide vein in altered ultramafic flows. Samples of this vein contain pyrite, chalcopyrite, up to 20% arsenopyrite and 6.36 ppm Au. A second thinner and shorter vein, the Stoney showing, cuts granite and consists of chalcocite, chalcopyrite, traces of molybdenite and 29.6 ppm Au.

The Jan showing is a 350 m by 200 m area of fractured and granulated quartz diorite enclosing quartz veins with sphalerite, galena, chalcopyrite, native copper, pyrite and up to 1.64 ppm Au.

The Sheba showing is the most significant. Boulders of sheared, altered and quartz-veined quartz-eye porphyry occur in a 700 m by 300 m area. The 75 samples collected contained up to 140 ppm Au and 680 ppm Ag and averaged 7.36 ppm Au and 67.7 ppm Ag. A soil geochemical survey of the area outlined two broad areas with anomalous metal concentrations, neither of which correspond directly with the area of boulders.

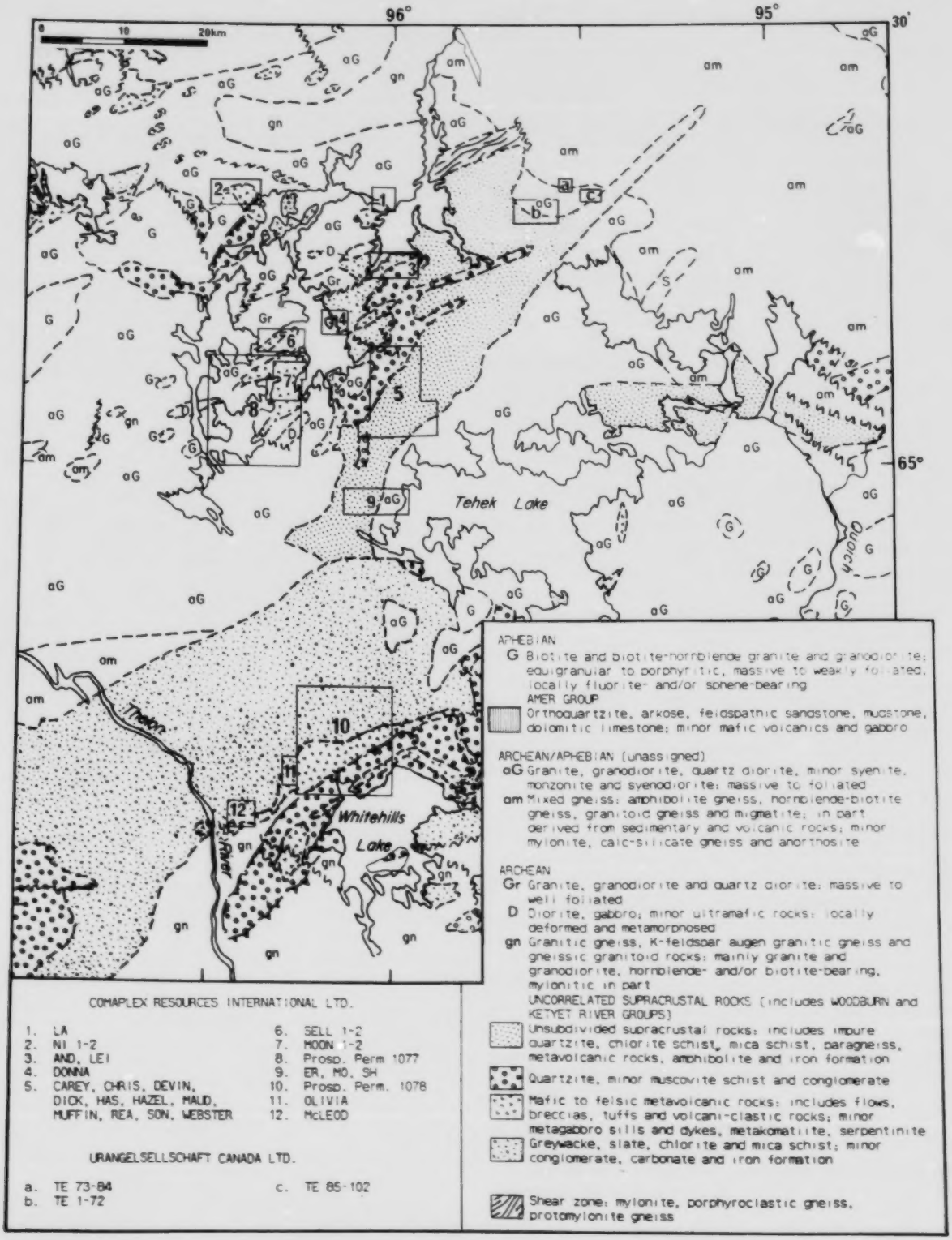

96°
95°
30'
65°
0 10 20km
Tehek Lake
Whitehills Lake
Thelon River
COMAPLEX RESOURCES INTERNATIONAL LTD.
1. LA
2. NI 1-2
3. AND, LEI
4. DONNA
5. CAREY, CHRIS, DEVIN, DICK, HAS, HAZEL, MAUD, MUFFIN, REA, SON, WEBSTER
6. SELL 1-2
7. MOON 1-2
8. Prosp. Perm 1077
9. ER, MO, SH
10. Prosp. Perm. 1078
11. OLIVIA
12. McLEOD
URANGELSELLSCHAFT CANADA LTD.
a. TE 73-84
b. TE 1-72
c. TE 85-102
APHEBIAN
G Biotite and biotite-hornblende granite and granodiorite; equigranular to porphyritic, massive to weakly foliated, locally fluorite- and/or sphene-bearing
AMER GROUP
Orthoquartzite, arkose, feldspathic sandstone, mudstone, dolomitic limestone; minor mafic volcanics and gabbro
ARCHEAN/APHEBIAN (unassigned)
aG Granite, granodiorite, quartz diorite, minor syenite, monzonite and svenodiorite; massive to foliated
am Mixed gneiss: amphibolite gneiss, hornblende-biotite gneiss, granitoid gneiss and migmatite; in part derived from sedimentary and volcanic rocks; minor mylonite, calc-silicate gneiss and anorthosite
ARCHEAN
Gr Granite, granodiorite and quartz diorite; massive to well foliated
D Diorite, gabbro; minor ultramafic rocks; locally deformed and metamorphosed
gn Granitic gneiss, K-feldspar augen granitic gneiss and gneissic granitoid rocks; mainly granite and granodiorite, hornblende- and/or biotite-bearing, mylonitic in part
UNCORRELATED SUPRACRUSTAL ROCKS (includes WOODBURN and KEYEY RIVER GROUPS)
Unsubdivided supracrustal rocks; includes impure quartzite, chlorite schist, mica schist, paragneiss, metavolcanic rocks, amphibolite and iron formation
Quartzite, minor muscovite schist and conglomerate
Mafic to felsic metavolcanic rocks; includes flows, breccias, tuffs and volcani-clastic rocks; minor metagabbro sills and dykes, metakomatiite, serpentinite
Greywacke, slate, chlorite and mica schist; minor conglomerate, carbonate and iron formation
Shear zone: mylonite, porphyroclastic gneiss, protomylonite gneiss

*FIGURE 5-9: Geology and properties, Tehek and Whitehills Lakes area (geology from Patterson and LeCheminant, 1985).*

***SAMPLING RESULTS FOR MOON CLAIMS***

| Site No. | | Description | Sample No. | Au (ppb) | Ag (ppm) | Cu (ppm) | Pb (ppm) | Zn (ppm) | Ni (ppm) | As (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | f.h. | quartz-veined diorite | | | | | | | | |
| | | minor pyrite in quartz veins | L1 | 29 | 0.5 | 52 | 6 | 29 | 10 | |
| | | gossanous quartz veins | L2 | 187 | 7.1 | 1260 | 11 | 63 | 35 | |
| L2 | f.h. | quartz vein over 3 m width | | | | | | | | |
| | | minor sulphides in quartz vein | L3 | 651 | 16.1 | 200 | 61 | 16 | 8 | |
| L3 | | quartz vein fragments on edge of outcrop | | | | | | | | |
| | | disseminated to massive sulphide | L4 | 91 | 15.4 | 352 | 520 | 148 | 40 | 31 |
| L4 | o.c. | quartz veins in sheared gossanous felsic volcanics (metasediments) | | | | | | | | |
| | | quartz eyes in med. grained volcanic | L5 | 77 | 0.6 | 23 | | | | |
| | | composite of grab samples over 5 m from sulphide-bearing fine grained schist | L9 | 1611 | 7.9 | 196 | 0.22% | 83 | 7 | 227 |
| | | fine grained quartz and sulphide rich schistose volcanic | L10 | 6000 | 15.9 | 1480 | 0.14% | 0.18% | 20 | 88 |
| L5 | o.c. | barren quartz vein in coarse felsic volcanic or intrusive | L11 | 29 | 0.3 | 6 | | | | |
| L6 | o.c. | same quartz vein as at L5 | | | | | | | | |
| L7 | f.h. | Treasure Trench area: numerous sulphide-bearing gossanous quartz veins/pods in schistose quartz-eye tuffs | | | | | | | | |
| | | quartz vein with galena, sphalerite and pyrite | L13 | 34286 | 103.0 | 446 | 9.3% | 0.36% | 10 | 48 |
| | | quartz vein with galena & pyrite | L14 | 18857 | 58.3 | 0.46% | 1.98% | 0.12% | 18 | 148 |
| | | quartz eye tuff | L15 | 1268 | 0.6 | 20 | 40 | 27 | 8 | 28 |
| | | gossanous schistose tuff | L16 | 171 | 1.2 | 10 | 0.12% | 310 | 4 | 26 |
| L8 | o.c. | amphibolite and amphibole gneiss (felsic volcanic) | | | | | | | | |
| L9 | o.c. | 10 m wide and 50-65 m long gossan in quartz-magnetite iron fm | | | | | | | | |
| | | composite of grab sample from coarse grained iron formation in 10 by 35 m area | L18 | 36 | 0.8 | 26 | 34 | 16 | 0.07% | 20 |
| | | finely banded iron formation with sulphides | L20 | 24 | 0.3 | 128 | 23 | 48 | 0.12% | 4 |
| L10 | o.c. | iron formation pinches out between mafic and felsic volcanics | | | | | | | | |
| | | iron formation with approximately 10% pyrite | L22 | 74 | 1.7 | 336 | 38 | 47 | 0.04% | 5 |
| L11 | o.c. | granodiorite | | | | | | | | |
| L12 | o.c. | quartzite metasediments which grades to the north into gossanous pyritic metasediments or iron formation, rock is cut by granodiorite dykes | | | | | | | | |
| | | composite of grab samples from 15 to 20 m zone of gossanous material | L25 | 53 | 0.5 | 54 | 18 | 197 | 0.09% | 3 |

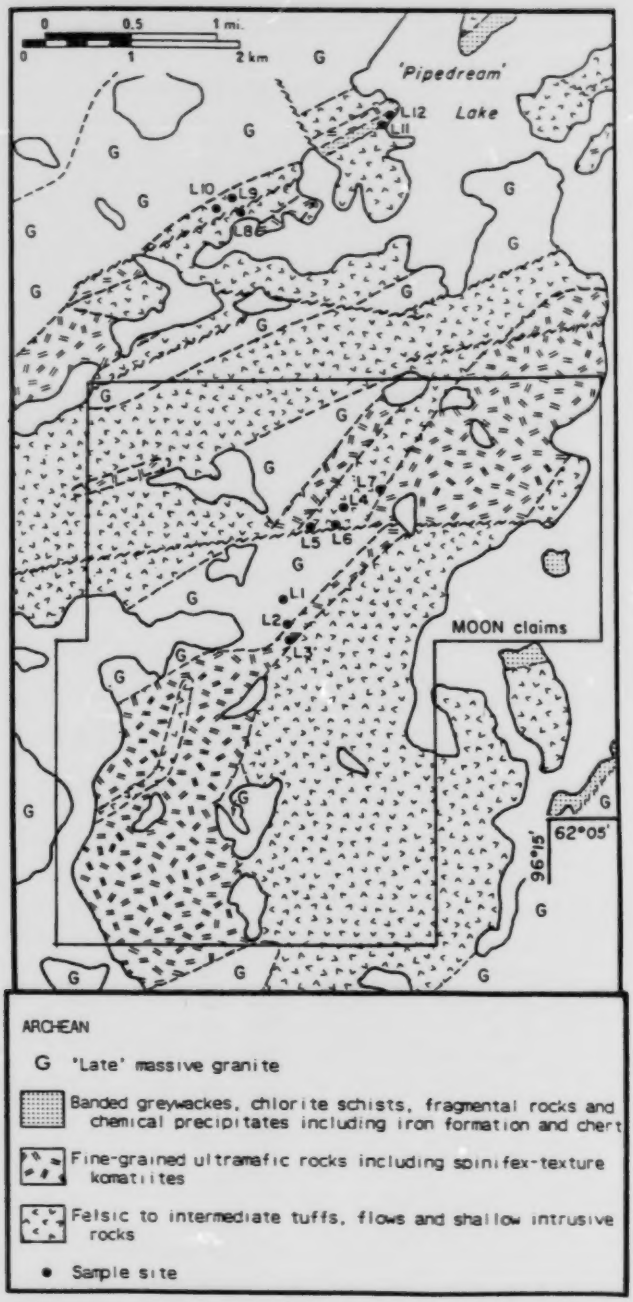



*FIGURE 5-10: Geology and results of author's sampling, MOON claims.*

## AMER-WOODBURN PROJECT

Urangesellschaft Canada Ltd.
3100, 2 Bloor St. E
Toronto, Ont., M4W 1A8

Uranium
56 E/5,6
65°18'N, 95°35'W

### REFERENCES

Ashton (1981, 1982); Laporte (1983a,b); Patterson and LeCheminant (1985).

### PROPERTY

| | |
|---|---|
| TE 1-84 | 56 E/5 |
| TE 85-102 | 56 E/6 |

### LOCATION

The claims are 25 km north of Tehek Lake (Fig. 5-9).

### HISTORY

In 1978, Urangesellschaft Canada Ltd. acquired Prospecting Permits 483 to 487, 490 and 491. Airborne radiometric and VLF-EM surveys, mapping and prospecting in 1978 and 1979 lead to the discovery of ten uranium showings. The showings were explored with detailed mapping and prospecting, magnetic, radiometric and VLF-EM surveys, mud-boil and $A_o$ horizon soil geochemical surveys and trenching (Laporte, 1983a,b). Four HI, 87 HEK and 102 TE claims were staked to cover the showings in October,1980. The permits lapsed in early 1981 and the HI and HEK claims lapsed in early 1983. The TE 1-84 claims lapsed in 1985 and 1986.

### DESCRIPTION

The project investigated the potential of a northeast-trending sequence of supracrustal rocks including quartzite, chlorite and mica schists, paragneiss, metavolcanic rocks, amphibolite and iron formation (Patterson and LeCheminant, 1985). Detailed mapping of the western outcrops by Ashton (1981, 1982) indicated that the supracrustal rocks, informally named the "Woodburn Lake Group", include an older sequence of felsic tuffs and rhyolites that grades upward into komatiites, felsic to intermediate metavolcanic rocks, banded iron formation and greywacke. Conglomeratic quartzite of uncertain age outcrops in the eastern parts of the area. The supracrustals are intruded to the south and north by granitic masses and extend to the northeast into mixed gneiss.

Four types of uranium showings were recognized: extensive, low-grade, possibly syngenetic, pitchblende disseminations in dirty metasediments; fracture-related uranium concentrations in orthoquartzite; radioactive concentrations in pyritic quartz-pebble conglomerate; and discontinuous radioactive mineral concentrations along the contact of intrusive granite and dirty quartzite.

### CURRENT WORK AND RESULTS

A two-person prospecting crew investigated the gold potential of the TE claims in 1985.

## LONE GULL DEPOSIT

Urangesellschaft Canada Ltd.
3100, 2 Bloor St. E
Toronto, Ont., M4W 1A8

Uranium
66 A/5
64°27'N, 96°37'W

### REFERENCES

Fuchs and others (1982); Laporte (1985a).
DIAND assessment reports: 061351 to 061355.

### PROPERTY

L 1-620 and SSL 1-128.

### LOCATION

The claims are north of Judge Sissons Lake (Fig. 5-11).

### HISTORY

The Lone Gull Deposit was discovered in 1974 during an airborne radiometric survey conducted by Metallgesellschaft Canada Ltd. on their Prospecting Permits 317 to 327. Two isolated anomalies were discovered 750 m apart on Prospecting Permit 318. The western anomaly corresponded to frost boils containing chips of metasediments coated with yellow,secondary uranium minerals. The eastern anomaly corresponded to grass-covered hummocky terrain near an outcrop of orthoquartzite. The L and SSL claims were staked in 1976 and Prospecting Permit 318 lapsed in 1977.

From 1975 to 1984, most of the claims were explored with a number of geochemical and geophysical surveys (Fuchs and others, 1982). Diamond drilling, begun in 1977, has identified three main uranium concentrations in arkosic sediments: the Main, Centre and Eastern or "46 E" Zones. By the end of 1983, drilling totalled 12,013 m in 77 holes on the Main Zone, 5323 m in 47 holes on the Centre Zone and 4314 m in 40 holes on the Eastern Zone. Fifty-five holes, totalling 6797 m, were drilled on other anomalies and showings on the claims between 1979 and 1983 (Laporte, 1985a).

### DESCRIPTION

The Lone Gull Deposit is in a sequence of arkosic quartzites and metapelites. The sequence includes garnetiferous impure quartzites, mafic chloritic metasediments, possibly of tuffaceous origin, and well-laminated siliceous beds. It is overlain by white orthoquartzite and underlain by greywacke. Granite, quartz-feldspar porphyry, lamprophyre, syenite and a diabase dyke intrude the metasediments on the Lone Gull grid.

Most of the uranium concentrations are in fracture zones and all have a well-defined alteration envelope. In the less altered rocks, chlorite, hematite and limonite formed along fractures. The more altered rocks are characterized by pervasive clay alteration (illite) with lesser chlorite, sericite, talc, hematite and limonite. The presence or absence of specific phyllosilicates is partly dependent on lithology; sericite is more common in the orthoquartzite and the underlying impure quartzite, but illite is common in the feldspathic quartzites. The chlorite may be an alteration of mafic-rich layers. The distribution of hematite and limonite is independent of other secondary minerals and probably reflects local reduction potential and permeability conditions. Pitchblende is commonly associated with limonite and

HELIKIAN
- Diabase dykes

DUBAWNT GROUP
- Thelon Formation: conglomerate and sandstone
- Quartz-hematite breccia

APHEBIAN
- Fluorite-bearing granite, syenite

ARCHEAN(?)
- M Monzonite
- D Diorite
- ag Augen gneiss
- Gr Quartz diorite to granodiorite
- bg Biotite gneiss (derived from sediments)
- a Amphibolite (derived from mafic volcanics and dykes)
- Felsic flows and tuffs
- Orthoquartzite, laminated, sericitic and pyritic quartzite, quartz phyllite
- 'Dirty quartzites': arkosic to lithic arenites, biotite and/or almandine gneiss, quartz arenite, mica schist
- Dolomitic carbonate rock
- Greywacke, lithic greywacke, arkosic wacke, subgreywacke (include some 'dirty' quartzites)
- Massive to pillowed mafic volcanics

• Data/sample collection point (P.J. Laporte)

URANGESELLSCHAFT CANADA LTD.
Project K-1, Baker Lake

1: OFF 10-11*
2: THE 1-82*
3: OFF 2-7*
4: PIZ 1-236*
5: COO 1-8°
6: LA 1-12°
7: DOVA 1-8
8: SHAY 1-8°
9: LAST 7,8
10: LAST 2-5; TREE 4
11: TREE 1-2*
12: OTHA 1-8
13: BAR 1-10
14: IT 1-591; KF 8-9°
78 SCH°
15: AJOL 1-8°
16: WUNZ 1-6
17: MAN 1-8
18: WAG 1-8
19: LYS 1-8
21: PED 1-4
22: CAM 1-6
24: BYA 3-6
25: UND 1-8°
26: BONG 1-8
27: BILA 1-8
29: BS 5

Lone Gull Deposit
20: L 1-620
23: SSL 1-128

n: F 5-13 - BP MINERALS LTD.

MARLINE MINERAL EXPLORATIONS LTD.
K: V 35-43*°; VW 8-14*°

* partly or totally lapsed in 1984
° partly or totally lapsed in 1985

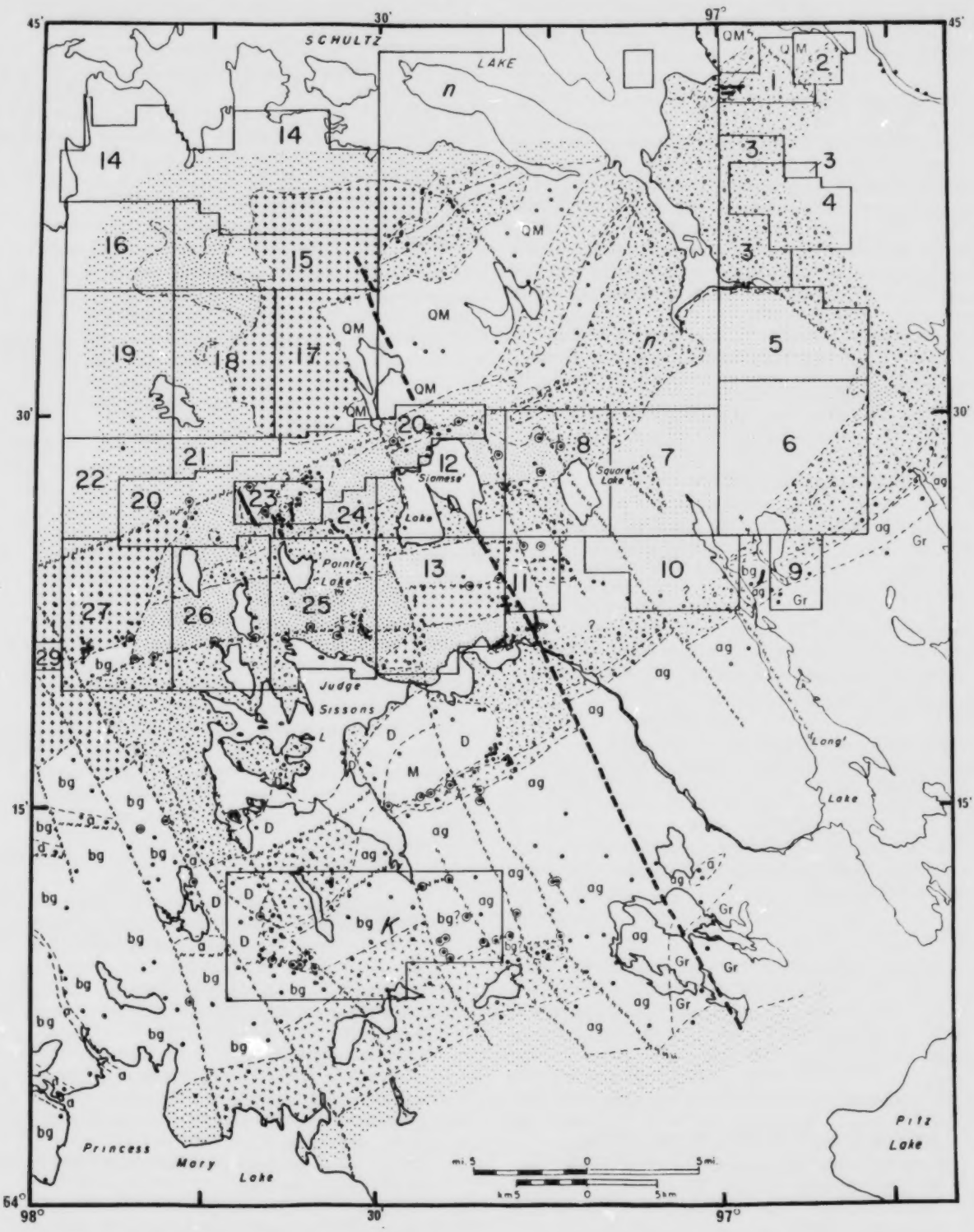



*FIGURE 5-11: Geology and properties, Schultz and Judge Sissons Lakes (geology by P.J. Laporte and compiled from assessment reports).*

rarely with hematite. In the dirty quartzites, pitchblende is in small blebs along fractures. Reserves are 16,000 t of $U_3O_8$ in rock grading 0.39% $U_3O_8$.

### CURRENT WORK AND RESULTS

Detailed geophysical and geochemical surveys were used to explore east and west of the Lone Gull grid in 1984 and 1985. Four holes, totalling 370 m, probed the western end of the Main Zone in 1984 and eight holes, totalling 1391 m, tested geophysical anomalies on the Granite grid, 5 km to the west-northwest of the Main Zone. All but two of the eight holes intersected uranium concentrations of interest. The best section contained 0.75% $U_3O_8$ over 5.8 m at a depth of 100 m (Northern Miner, Nov. 8, 1984).

Drilling resumed in 1985 with 15 holes totalling 3967 m probing the continuity and depth of the Main Zone. Eleven holes totalling 1945 m tested the uranium showing on the Granite grid.

## PROJECT K-1, BAKER LAKE

Urangesellschaft Canada Ltd.
3100, 2 Bloor St. E
Toronto, Ont., M4W 1A8

Uranium
66 A/5-7,10,12; B/8
64°30'N, 97°30'W

### REFERENCES

Donaldson (1966, 1969); Laporte (1983b, 1984, 1985a); LeCheminant and others (1983); Northern Miner (1984).

DIAND assessment reports: 081374, 081530, 081913, 082055.

### PROPERTY

The claims held by Urangesellschaft Canada Ltd. and forming part of this project are listed in Figure 5-11.

### LOCATION

Urangesellschaft's Project K-1 area extends north and northeast from Judge Sissons Lake to Schultz Lake and the Thelon River (Fig. 5-11).

### HISTORY

Urangesellschaft Canada Ltd. has been exploring the Judge Sissons Lake area since 1974 when an affiliated company, Metallgesellschaft Canada Ltd., acquired Prospecting Permits 317 to 327. Urangesellschaft Canada Ltd. acquired Prospecting Permits 352 and 353 in 1975. SCH 1-136 and SSL 1-128 were staked in 1976 and IT 1-591, L 1-620, PIZ 1-236 and THE 1-82 in 1977. Most of the other claims were acquired in 1978 and KF 1-9 and LAST 1-8 were staked in 1979. Eighty-eight BS, DF, LAST, MOR, OFF, SCH and TREE claims lapsed between 1980 and 1983. One BS, eight OFF and two TREE claims lapsed in 1984, as did all the PIZ and THE claims. The remaining SCH, one AJOL, two COO, one LA, four SHAY and one UND claims lapsed in 1985.

Reconnaissance geochemical surveys, airborne VLF-EM, radiometric and magnetometer surveys, geological mapping and prospecting of the claims in 1978 and 1979 outlined numerous anomalies. Fifty-one grids were established between 1979 and 1983 and explored with geological, geochemical and geophysical surveys (Laporte, 1983b, 1984, 1985a). In 1980, 27 holes totalling 2127 m intersected minor uranium concentrations on three of the grids and barren granite and syenite on a fourth grid (Laporte, 1984). Seven holes totalling 756.6 m were drilled in 1982 and nine holes totalling 1278 m were drilled in 1983. The 1982 holes intersected minor phosphate-related uranium concentrations, while the 1983 holes probed uneconomic concentrations of $U_3O_8$ in orthoquartzite and the underlying impure quartzites (Laporte, 1985a).

### DESCRIPTION

The project involves a study of the western end of a metasedimentary belt trending northeast from Judge Sissons Lake to north of Whitehills Lake (Donaldson, 1966, 1969; LeCheminant and others, 1983). The following description is based on mapping by the author between 1981 and 1983 and by Urangesellschaft geologists in 1980 and 1981. Outcrop in the area is sparse and most of the observations were from areas of angular frost heave.

The oldest rocks in the area are the complex of augen gneiss and quartz diorite to granodiorite extending south and east from Judge Sissons Lake (Fig. 5-11). The augen gneiss consists of large feldspar crystals in a matrix of medium- to fine-grained andesine and fine-grained quartz, mica and hematite. Whether the augen gneiss was derived from the granodiorite during tectonic deformation or is intruded by the plutonic rocks has yet to be determined.

Overlying the augen gneiss northeast of Princess Mary Lake is a sequence of massive, relatively structureless volcanic flows. The rocks are fine- to medium-grained assemblages of chlorite-calcite-epidote aggregates after plagioclase, separated by chlorite, quartz and sphene. The volcanic sequence is repeated through faulting on the south shore of Judge Sissons Lake. Pillowed volcanics also outcrop near the base of the sedimentary package east of "Long" Lake and tephra outcrops near a diorite-monzonite complex contact east of Judge Sissons Lake. The volcanics grade, to the west, into amphibolite and amphibole gneiss.

The volcanics are overlain to the north by a sedimentary package including:

- magnetic iron formation which outcrops in proximity to the volcanics on the east shore of Judge Sissons Lake and northeast of Long Lake. The western outcrops consist of banded magnetite-garnet-quartz rock and amphibole-garnet-biotite rock with minor magnetite. The eastern occurrence consists of banded chert, hematite, and pyrite;
- greywacke ranging in composition from lithic greywackes with 50% fragments to feldspathic greywackes with 5 to 40% feldspars. Carbonate-rich greywackes with up to 40% carbonate are also present in the sequence;
- pelitic rocks including mica and chlorite schists with 45 to 75% phyllosilicates;
- feldspathic to quartzitic arenites and wackes containing 30 to 80% quartz and up to 25% feldspars;
- dolomite and calcareous siltstone which outcrop in restricted areas northeast of Judge Sissons Lake, near Long Lake and along the Thelon River;
- white orthoquartzite which overlies the other sediments

north and northeast of Judge Sissons Lake and south of Schultz Lake.

The sediments grade westward into biotite gneiss which encloses an amphibolite dyke and has been altered, near faults, into augen gneiss.

Urangesellschaft geologists indicate that the lower lithic greywackes north of Judge Sissons Lake grade, through a decrease in size and abundance of lithic clasts, into more quartzose and less feldspathic impure arkosic to subarkosic arenites and wackes. The arenites are interbedded with orthoquartzite and phyllites, which are locally graphitic or garnetiferous. The contact between the main orthoquartzite sequence and the arenite sequence is apparently conformable but poorly exposed.

The supracrustals are intruded by igneous bodies of different ages. The oldest two intrusions outcrop south and east of Judge Sissons Lake and south of Schultz Lake. These bodies intrude the volcanics and lowermost part of the sedimentary package but are not found in contact with the orthoquartzite. The body near Judge Sissons Lake consists of monzonite to the southeast and diorite to the west. The body near Schultz Lake was mapped as quartz monzonite by B.P. Minerals Ltd. geologists. The relationship between these two bodies, if any, is unknown.

The younger intrusions are a complex mixture of fluorite-bearing biotite granite and syenite outcropping as a large body along the northwestern edge of the area, as a smaller pluton northeast of Judge Sissons Lake and in small stocks in the vicinity of the Lone Gull Deposit.

The youngest supracrustals in the map area belong to the Dubawnt Group. They include quartz-hematite breccia or regolith and Thelon Formation sandstone and conglomerate. Rocks mapped as regolith range from angular quartz clasts in a fine-grained quartz, clay and hematite matrix to massive quartz-clay-hematite rock. These rocks are cut by numerous quartz veins and quartz-specularite veins and are preserved in fault zones, especially the east-trending faults, and in one area southeast of Judge Sissons Lake. In two outcrops south of Judge Sissons Lake, regolith is associated with dykes of Pitz Formation quartz porphyry.

Thelon Formation sandstone and conglomerate outcrop on the north shore and east of Princess Mary Lake, in two restricted areas southwest of Judge Sissons Lake and in a belt north of "Pointer" Lake. These rocks are less indurated than the other sediments in the area.

Because of the paucity of outcrop, very few bedding plane orientations could be determined. The orthoquartzite south of Schultz Lake trends north-northeast and dips shallowly to steeply west. Rocks north of Pointer Lake trend east and dip shallowly north. Rocks east of Pointer Lake trend north-northeast and dip west, while further east they trend east and dip shallowly to steeply south. The rocks near Judge Sissons Lake trend east and dip shallowly south, except on the main island, where the dip is steeply south, and to the east where a steep northerly dip was recorded. The volcanics south of Judge Sissons Lake dip north. Layering in the gneisses and gneissic intrusions parallels the contact with the supracrustals except in the vicinity of faults. The distribution of lithologies and structural data indicate that the rocks north of Judge Sissons Lake are part of an east- to northeast-trending anticline.

Three generations of major faults cross-cut the area. The oldest is the east-trending thrust or reverse fault causing the repetition of the stratigraphy south of Judge Sissons Lake. A second generation, possibly related to the thrust fault, is the east-trending faults at the south end and north of Judge Sissons Lake. Aeromagnetic and outcrop patterns indicate an apparent right lateral displacement of 15 km along the fault north of Pointer Lake. Most of the regolith is along these east-trending faults. The northeast- trending fault near the Lone Gull Deposit is possibly part of a conjugate set with the east-trending faults. The youngest faults trend north-northwest and served as the locus for intrusion of the Mackenzie diabase dykes. Apparent displacement along these faults range from 3 km right lateral to 10 km left lateral. True displacement was probably vertical.

### CURRENT WORK AND RESULTS

Detailed geophysical surveys including gravity, VLF-EM and MaxMin and geochemical surveys were done in 1984 on grids west and north of Pointer Lake, northwest of "Square" Lake and north of Long Lake. The orthoquartzite-arenite contact north of Long Lake was prospected, as was the area northeast of Judge Sissons Lake. Six holes totalling 1067 m were drilled on the Bong grid, previously Roughland and Area 8 grids (Laporte, 1985a), 5 km west of Pointer Lake. The holes intersected discontinuous uranium concentrations in a 12 m wide zone. The best assay was 0.6% $U_3O_8$ over 6.1 m at a depth of 140 m (Northern Miner, Nov. 8, 1984).

On the PL 23 grid, north of the Lone Gull Deposit, 40 reverse circulation holes totalling 1176.6 m probed radon anomalies. Twenty-five of the holes penetrated 2 to 52 m into bedrock. Geophysical and geochemical surveys were also completed on this and other nearby grids.

Further geophysical, geochemical and geological surveys were undertaken in 1985. The area west of the Bong grid was explored. Nineteen holes totalling 4476.9 m tested the showing discovered on the Bong grid in 1984 and four holes totalling 521.5 m were drilled on anomalies on the Caribou grid 6 km to the southeast. Three holes totalling 420.0 m tested anomalies on the RD 3/4 grid north of Long Lake. In the northwestern part of the claim group, 14 holes totalling 2117.8 m tested two anomalies on WAG 1, 2, 4 and 5.

## WHITEHILLS LAKE PROJECT

Comaplex Resources Intern'l Ltd.
901, 1015 Fourth St. SW
Calgary, Alta., T2R 1J4

Gold
66 A/9
65°42'N, 96°15'W

### REFERENCES

Laporte (1974a, 1984, 1985b); Taylor (1986).
DIAND assessment report: 081938.

### PROPERTY

Prospecting Permit 1078, MCLEOD and OLIVIA.

### LOCATION

The prospecting permit and OLIVIA are north of the western half of Whitehills Lake. MCLEOD is west of Whitehills Lake and 3 km east of the Thelon River (Fig. 5-9).

### HISTORY

The area west of Whitehills was held as Prospecting Permit 93 by Ensign Oil Ltd. and Fort Reliance Minerals Ltd. from 1969 to 1972. Airborne and ground geophysical surveys and geological surveys done in 1969 and 1979 outlined 29 conductors, nine of which were considered to be of interest (Laporte, 1974a).

The northern part of the area was held as Prospecting Permits 753 and 754 by Hudson's Bay Oil and Gas Company Ltd. between 1981 and 1983. Geological mapping, prospecting, ground and airborne geophysical surveys were done over the volcanic belt north of Whitehills Lake (Laporte, 1984).

Comaplex Resources International Ltd. acquired Prospecting Permit 1078 in 1985. The OLIVIA and MCLEOD claims were added to the property in September and December.

### DESCRIPTION

An east-northeast trending sequence of greywackes underlies the northern part of the properties. It is overlain to the south by a zone of varied lithology consisting of iron formation, slate, dolomite, argillite, siltstone and phyllite intruded by small plutons of gabbro, peridotite and serpentinite. Mafic volcanic rocks, enclosing komatiites near the base, and thin layers of greywacke, iron formation and felsic volcanic rocks overlie the zone of varied lithology. A prominent white orthoquartzite is interlayered with and locally thrust onto the volcanic sequence along the north shore of Whitehills Lake. West and northwest of Whitehills Lake, the volcanic rocks at or near their contact with the orthoquartzite are intruded by gneissic to massive granodiorite (Taylor, 1986).

Most of the geophysical anomalies detected in 1969 and 1970 are associated with a major band of iron formation outcropping discontinuously at the top of the greywacke sequence from the Thelon River to east of Whitehills Lake. Other anomalies correspond to shear zones in the volcanics (Laporte, 1974a). Hudson's Bay Oil and Gas Company Ltd. geologists reported that a quartz-carbonate vein north of Whitehills Lake contained 520 ppb Au (Laporte, 1984).

During an investigation of the gold potential of the area by the author, samples were collected from iron formation (17 samples), carbonate-bearing shear zones (3 samples) and quartz veins (11 samples) in the Whitehills Lake area. Two of the samples of iron formation contained 514 ppb Au and 38 ppb Au. Samples of the carbonate zones contained up to 38 ppb Au and those of quartz veins contained up to 171 ppb Au (Laporte, 1985b).

### CURRENT WORK AND RESULTS

Prospecting of the Whitehills Lake area in 1985 resulted in the discovery of a quartz vein, containing up to 11.9 ppm Au, at the granodiorite-volcanic contact along the west edge of the permit area. At the north end of the vein, fractures in the quartz are coated with stibnite, a sample of which contained 125 ppm Au. Smaller quartz veins and disseminated chalcopyrite, in the basalts north of the vein, contain up to 3.3 ppm Au and 178 ppm Ag.

## MARJ CLAIMS

PNC Exploration (Canada) Co. Ltd.
2401, 650 West Georgia St.
Box 11571, Vancouver Centre
Vancouver, B.C., V6B 4N8

Uranium
66 B/3, 5,6
64°25'N, 99°23'W

### REFERENCES

Laporte (1978, 1979, 1983a,b, 1984, 1985a); LeCheminant and others (1983, 1984).

DIAND assessment reports: 081842, 081845.

### PROPERTY

MARJ 1-16.

### LOCATION

The claims are north of Marjorie Lake and south of Aberdeen Lake (Fig. 5- 12).

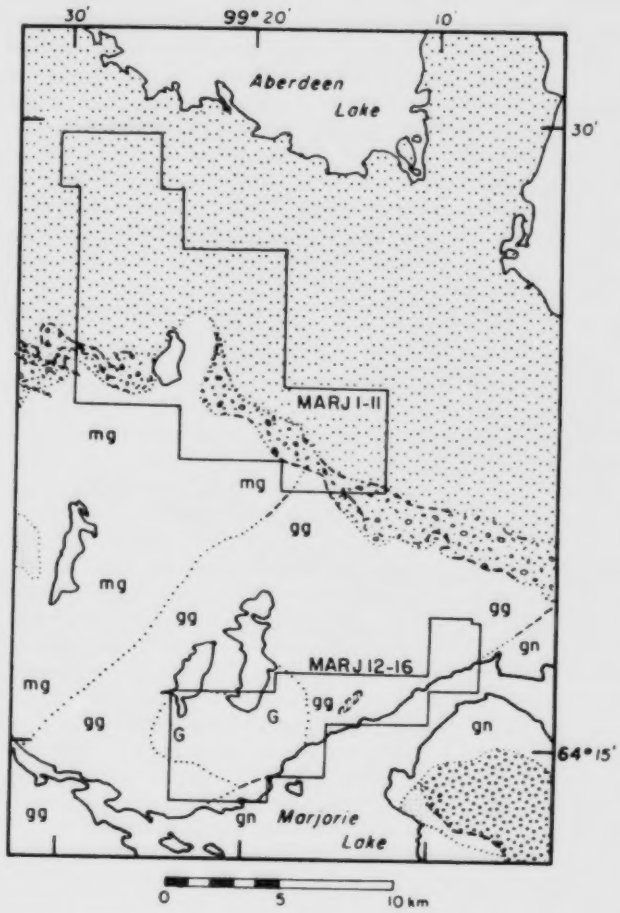
### HISTORY

MARJ 1-11 were staked in 1983 and MARJ 12-16 in 1984. The claims cover ground held by Urangesellschaft Canada Ltd. as Prospecting Permit 354 and the BA and MAJ claims between 1975 and 1982. Exploration of the Marjorie-Aberdeen Project between 1975 and 1982 included airborne and ground geophysical surveys, geochemical surveys and geological mapping. Fracture-related uranium concentrations on the AB claims, southeast of the MARJ claims, were drilled in 1982 with discouraging results (Laporte, 1978, 1979, 1983a,b, 1984). The MARJ 1-11 claims and adjacent areas were explored in 1983 with mapping, prospecting and lake sediment sampling. A grid was constructed along the unconformity on the claims and explored with detailed geological mapping, boulder prospecting, magnetic, EM-16 and radiometric surveys and overburden sampling (Laporte, 1985a). MARJ 1 and 2 lapsed in 1985.

### DESCRIPTION

Archean or early Proterozoic granite, gneissic granite and granitic augen gneiss underlie the southern part of MARJ 1-11. This granitic complex is overlain to the north and west by acid volcanics and subvolcanic intrusions, arkose and conglomerate of the Pitz and Kunwak Formations. Sandstone of the Thelon Formation overlies these rocks in the northern half of the claims.

MARJ 12-16 cover part of a northeast-trending,complex tectonic zone 8 to 10 km wide. The heterogeneous mixture of retrograded gneisses, gneissic granite, fine-grained mylonitic augen gneisses and chlorite schist of this zone enclose a less than 100 m wide tectonic sliver of Aphebian orthoquartzite north of Marjorie Lake. In the western part of the claim group, the gneisses are intruded by massive to weakly foliated, fluorite-bearing biotite granite (LeCheminant and others, 1983, 1984).




HELIKIAN and LATE APHEBIAN
DUBAWNT GROUP

Thelon Fm: Quartz arenite, minor mudstone and conglomerate

: Ortho- and paraconglomerates with clasts of porphyritic volcanic rocks, minor lithic sandstone and mudstone

Pitz Fm: Quartz- and feldspar-phyric lavas and welded tuffs

: Quartz arenite (aeolian?), minor conglomerate

APHEBIAN

G Biotite granite; massive to weakly-foliated, fluorite-bearing

Quartzite, minor mica schist

APHEBIAN/ARCHEAN

gg Cataclastic granitoid gneisses, gneissic granite, minor chloritic metasediments

mg Megacrystic gneissic granite and augen granite gneiss

gn Layered to weakly foliated granitic and granodiorite gneisses and migmatite; minor augen gneiss, biotite-garnet paragneiss and amphibolite

*FIGURE 5-12: Geology of the MARJ claims (geology from LeCheminant and others, 1983).*

## CURRENT WORK AND RESULTS

A 1500 line km helicopter-borne radiometric survey of the area north and east of Marjorie Lake outlined 466 anomalies in 1984. Subsequent reconnaissance geological mapping and prospecting of 433 of the anomalies led to the discovery of 22 anomalous concentrations of uranium, most of which were associated with phosphatic enrichment in Thelon Formation sandstone and the underlying regolith. Lithogeochemical studies were performed on the basal Thelon Formation rocks.

Two grids were established. Grid B, totalling 63.6 line km, on the north shore of Marjorie Lake was explored with geological mapping, prospecting and 58.6 line km of magnetic, gradiometric and VLF-EM surveys. The grid covers a metasedimentary sequence striking northeast, dipping steeply northwest and intruded by biotite granite to the north. The geophysical surveys delineated northwest-trending faults in the area but no uranium concentrations were detected.

Grid C, to the east, totals 22.6 line km and was explored with mapping, prospecting and radiometric, VLF-EM and Track Etch surveys. It covers two areas of uranium-bearing boulders of brecciated Pitz Formation volcanics and older metasediments. The breccia fragments are cemented by apatite-hematite veins and patches.

## PROJECT DUBAWNT

Westmin Resources Ltd.
25 Adelaide St. E
Toronto, Ont., M5C 1Y2

Uranium
66 B,C,G,H

### REFERENCES

Laporte (1979, 1981, 1983a,b, 1984, 1985a); LeCheminant and others (1984); Tella (1984); Tella and others (1983, 1984).

DIAND assessment reports: 081778, 081856.

### PROPERTY

The properties explored are listed in Fig. 5-13.

### HISTORY

Westmin Resources Ltd. and its precursors have been exploring the project area since 1976 when Prospecting Permits 425 and 427 and U 1-159 were acquired. Prospecting Permit 466 and AZW 1-30, CAN 1-178, 97 CHE, LIK 1-99, NOR 1-165 and TIB 1-196 were acquired in 1977. Prospecting Permits 468, 469, 537 to 542, UM 1-8 and WGE 1-4 were acquired in 1978. EH, GALLIUM 1-6, GC 1-2, GSE 1-2, LA 1, LAPLAND, LONGSPUR, TERN and WES 1-12 were added in 1979 and another 95 claims in 1980. Prospecting Permits 425 to 427 and 466 expired in 1980, Prospecting Permits 468 and 469 in 1981 and Prospecting Permits 537 to 542 in early 1982. In 1980 and 1981, 126 claims were allowed to lapse. More claims lapsed in 1982 and 1983. AUG 13 and RHM 2 were staked in 1984. GALLIUM 6, GMF 7 and 9, GRACE 1 and 3, LONGSPUR 1, RAD 2 and 3, SARA 1, UM 1 and 6 and WEST 4 and 12 had their areas reduced in 1984.

Geological and geochemical surveys done in 1976 and 1977 led to the discovery of a number of uranium concentrations in Amer Group sediments, one of which was probed with seven

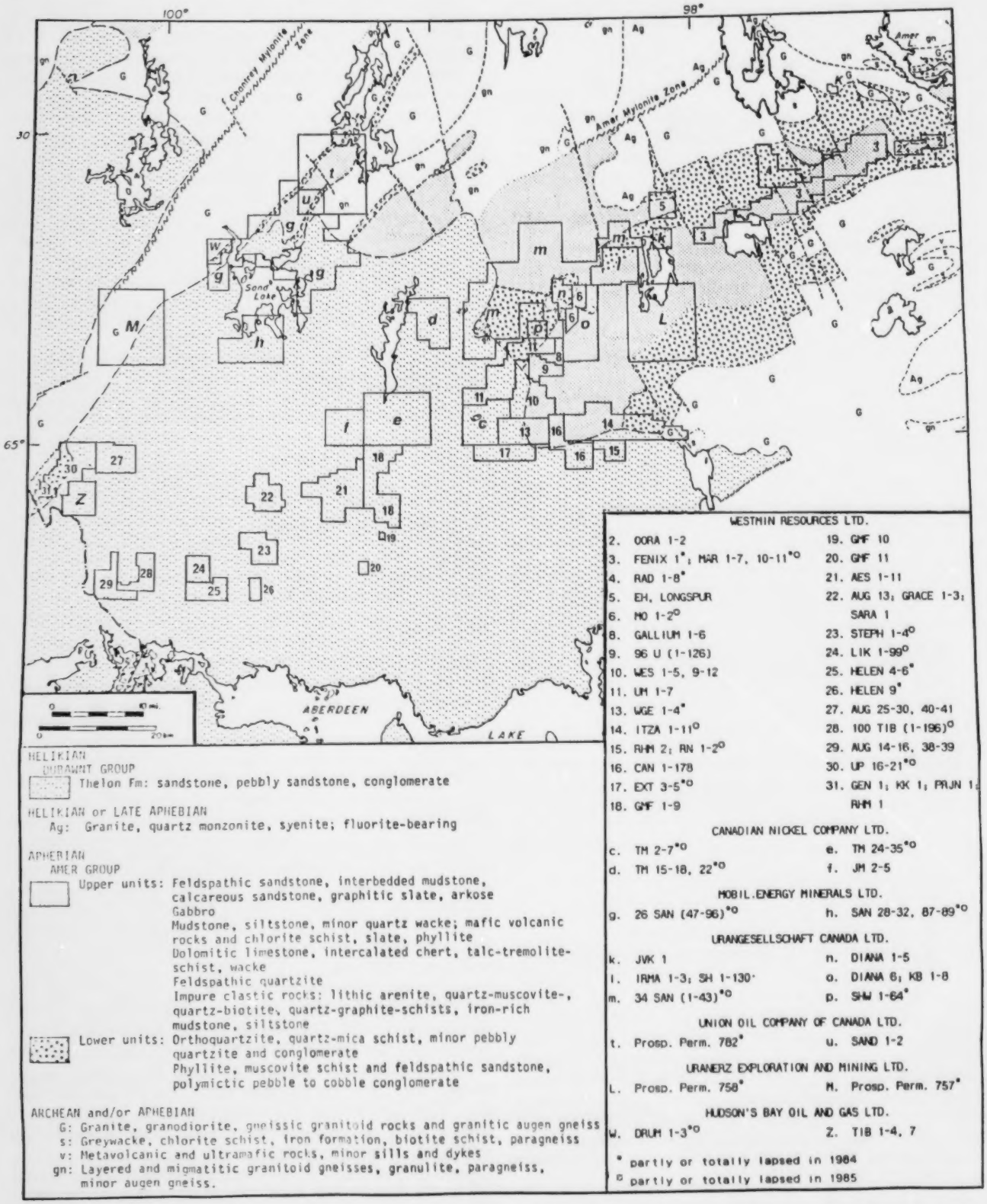

100°
98°
30
65°
Chantrey Mylonite Zone
Amer Mylonite Zone
Sand Lake
ABERDEEN LAKE
0 20 km
HELIKIAN
DUBAWNT GROUP
Thelon Fm: sandstone, pebbly sandstone, conglomerate
HELIKIAN or LATE APHEBIAN
Ag: Granite, quartz monzonite, syenite; fluorite-bearing
APHEBIAN
AMER GROUP
Upper units: Feldspathic sandstone, interbedded mudstone, calcareous sandstone, graphitic slate, arkose
Gabbro
Mudstone, siltstone, minor quartz wacke; mafic volcanic rocks and chlorite schist, slate, phyllite
Dolomitic limestone, intercalated chert, talc-tremolite-schist, wacke
Feldspathic quartzite
Impure clastic rocks: lithic arenite, quartz-muscovite-, quartz-biotite, quartz-graphite-schists, iron-rich mudstone, siltstone
Lower units: Orthoquartzite, quartz-mica schist, minor pebbly quartzite and conglomerate
Phyllite, muscovite schist and feldspathic sandstone, polymictic pebble to cobble conglomerate
ARCHEAN and/or APHEBIAN
G: Granite, granodiorite, gneissic granitoid rocks and granitic augen gneiss
s: Greywacke, chlorite schist, iron formation, biotite schist, paragneiss
v: Metavolcanic and ultramafic rocks, minor sills and dykes
gn: Layered and migmatitic granitoid gneisses, granulite, paragneiss, minor augen gneiss.
WESTMIN RESOURCES LTD.
2. OORA 1-2
3. FENIX 1*; MAR 1-7, 10-11*O
4. RAD 1-8*
5. EH, LONGSPUR
6. MO 1-2O
8. GALLIUM 1-6
9. 96 U (1-126)
10. WES 1-5, 9-12
11. UM 1-7
13. WGE 1-4*
14. ITZA 1-11O
15. RHM 2; RN 1-2O
16. CAN 1-178
17. EXT 3-5*O
18. GMF 1-9
19. GMF 10
20. GMF 11
21. AES 1-11
22. AUG 13; GRACE 1-3; SARA 1
23. STEPH 1-4O
24. LIK 1-99O
25. HELEN 4-6*
26. HELEN 9*
27. AUG 25-30, 40-41
28. 100 TIB (1-196)O
29. AUG 14-16, 38-39
30. UP 16-21*O
31. GEN 1; KK 1; PRJN 1; RHM 1
CANADIAN NICKEL COMPANY LTD.
c. TM 2-7*O
d. TM 15-18, 22*O
e. TM 24-35*O
f. JM 2-5
MOBIL ENERGY MINERALS LTD.
g. 26 SAN (47-96)*O
h. SAN 28-32, 87-89*O
URANGESELLSCHAFT CANADA LTD.
k. JVK 1
l. IRMA 1-3; SH 1-130*
m. 34 SAN (1-43)*O
n. DIANA 1-5
o. DIANA 6; KB 1-8
p. SHW 1-64*
UNION OIL COMPANY OF CANADA LTD.
t. Prosp. Perm. 782*
u. SAND 1-2
URANERZ EXPLORATION AND MINING LTD.
L. Prosp. Perm. 758*
M. Prosp. Perm. 757*
HUDSON'S BAY OIL AND GAS LTD.
W. DRUM 1-3*O
Z. TIB 1-4, 7
* partly or totally lapsed in 1984
O partly or totally lapsed in 1985

*FIGURE 5-13: Geology and properties north of Aberdeen Lake (geology from Donaldson, 1966; LeCheminant and others, 1984; Tella, 1984).*

Winkie drill holes (Laporte, 1978, 1981). Geochemical, airborne geophysical and geological work further to the southwest in 1978 and 1979 outlined 14 areas of anomalies requiring follow-up surveys (Laporte, 1983a,b). Seven of these areas were explored with ground surveys in 1980 and 13 holes totalling 1855 m were drilled to obtain stratigraphic information about the Thelon Formation. Detailed airborne geophysical surveys and geochemical surveys were done in 1981 (Laporte, 1984). Seven areas of interest outlined during these surveys were explored with detailed geological, geophysical and geochemical surveys in 1982 (Laporte, 1985a).

### DESCRIPTION

A 20 to 30 km wide belt of Aphebian Amer Group orthoquartzite, shale, siltstone, feldspathic sandstone and dolomitic limestone trends southwest in the eastern part of the project area. The sedimentary rocks are flanked by granitic gneisses to the northwest and southeast and are overlain to the southwest by sandstone and pebbly sandstone of the Helikian Thelon Formation (LeCheminant and others, 1984; Tella, 1984; Tella and others, 1983, 1984).

Three types of uranium occurrences have been detected: unconformity vein-type; Aphebian (syngenetic); and sandstone-hosted (phosphatic). The unconformity vein-type showings are narrow stockwork fractures with chlorite, calcite, hematite, kaolinite and quartz in feldspathic quartzite of the Amer Group. Samples of boulders from the RAD claims contain up to 1.6% $U_3O_8$, but average 0.1% $U_3O_8$. Samples from other unconformity-type boulder trains on the EH/LONGSPUR and UM claim blocks contained up to 4.5 and 13.3% $U_3O_8$. The syngenetic showings are pelite-hosted nodular concentrations and pore fillings of pitchblende, chalcopyrite, pyrite, magnetite and calcite in sandy interlayers and siltstone of the Amer Group. Grab samples contain up to 2.71% $U_3O_8$, but these showings generally contain 0.05% $U_3O_8$ over 2 to 2.5 m widths. The sandstone-hosted deposits contain up to 0.1% $U_3O_8$, generally associated with various amounts of phosphate. Some showings occur in strongly brecciated zones.

### CURRENT WORK AND RESULTS

Two grids, in Area 2 (ITZA, RHM and RN claims) and Area 7 (AUG, GRACE and SARA claims), were each extended 16 line km in 1984. The geomorphology of these grids was mapped and they were explored with VLF-EM and radon-in-soil surveys. The grid on Area 2 was also prospected and surveyed with scintillometers. Anomalous radon concentrations were detected in both areas associated with the head of the trains of uranium-bearing boulders. Perimeter surveys of nine claim blocks were also completed in 1984.

## UP CLAIMS

Westmin Resources Ltd.
25 Adelaide St. E
Toronto, Ont., M5C 1Y2

Uranium
66 C/16; F/1
65°00'N, 100°15'W

### REFERENCES

Laporte (1984, 1985a); LeCheminant and others (1984); Tella (1984); Tella and others (1984).

DIAND assessment report: 081597.

### PROPERTY

GEN 1, KK 1, PRJN 1, RHM 1, and UP 16-21.

### LOCATION

The claims are north of Beverly Lake (Fig. 5-13).

### HISTORY

UP 1-22 were staked in June, 1980 for Seru Nucleaire (Canada) Ltee. who explored the property with INPUT and helicopter-borne radiometric surveys, geochemical lake water and sediment and soil surveys, mapping and prospecting. In 1981, a grid established on an INPUT conductor was tested with prospecting, a detailed geochemical lake water and sediment survey, mapping, magnetometer, resistivity, VLF-EM and gravity surveys, radon-in-soil and frost boil geochemical surveys (Laporte, 1984). UP 16-21 were transferred to Westmin Resources Ltd. and UP 1-15 and 22 were allowed to lapse in 1982.

In 1982, a Westmin Resources Ltd. crew established grid lines intermediate to the existing lines and surveyed them with MaxMin and VLF-EM. Geological mapping and a 833-site radon-in-soil survey were also done (Laporte, 1985a). GEN 1, KK 1, PRJN 1 and RHM 1 were added to the property in 1984 and UP 21 was reduced in area. UP 16 lapsed in 1984 and UP 18 lapsed in 1985.

### DESCRIPTION

The north shore of Beverly Lake is underlain by Helikian Thelon Formation sandstone. The unconformity between the sandstone and the granitic basement complex trends northeast from north of Beverly Lake across the property to northwest of Sand Lake. A belt of Amer Group sediments outcrops at the unconformity on the claims (LeCheminant and others, 1984; Tella, 1984; Tella and others, 1984).

### CURRENT WORK AND RESULTS

The original grid was extended to the southwest and the additional 25 line km were explored with radiometric and VLF-EM surveys and a 923-site radon-in-soil survey. Boulder prospecting and geomorphological mapping were also done. Anomalous radon gas concentrations of up to 12 times background were detected, as were a number of well-defined conductors thought to correspond to graphitic layers in the Amer Group metasediments. A perimeter survey of the new and reduced claims was completed.

## DEEP ROSE PROJECT

Urangesellschaft Canada Ltd.
3100, 2 Bloor St. E
Toronto, Ont., M4W 1A8

Uranium
66 G/2,7,8
65°12'N, 98°55'W

### REFERENCES

Laporte (1983b, 1985a); Taylor (1978); Tella(1984).
DIAND assessment reports: 081806, 081807, 081848.

### PROPERTY

The properties explored are listed in Figure 5-13.

### LOCATION

The project covers the area east of Sand Lake (Fig. 5-13).

### HISTORY

Urangesellschaft Canada Ltd. began exploring the area in 1974. Lake sediment and water geochemical surveys, airborne radiometric and magnetic surveys, mapping and prospecting led to the discovery of numerous uranium-bearing boulder trains. Grids established on the claims were explored, from 1978 to 1983, with one or more of the following surveys: soil sampling, radiometric, magnetic, VLF-EM and HLEM, IP and gravity surveys, prospecting, mapping, Alpha Nuclear and Track Etch radon measurements and soil geochemical surveys. Eight holes totalling 924.8 m were drilled to locate the source of the boulders on the SH claims in 1979 (Laporte, 1983b).

### DESCRIPTION

The properties cover the unconformable contact between southwest-trending Aphebian Amer Group metasediments and the overlying Helikian Thelon Formation sandstone and conglomerate. The Amer Group rocks include orthoquartzite and quartz-mica schist overlain by feldspathic sandstone with interbedded mudstone, calcareous sandstone, siltstone, graphitic slate and arkose. These rocks are deformed into a series of upright to overturned synclines and anticlines and enclose gabbro sills which outcrop in the southeastern part of the claims (Tella, 1984).

Taylor (1978) recognized four rock types in the area of the uranium showing on the SH claims:

- thin siltstone and mudstone beds interbedded with thin, crenulated hematitic arkosic arenites;
- fine-grained, pink hematitic arkosic arenite with a few thin light green to brown mudstone interbeds;
- dolomitic sandstone with a few pink arkosic sandstone interbeds; and
- grey to black siltstone with a few grey mudstone interbeds and irregular lenses of purple, hematitic, arkosic sandstone containing disseminated magnetite and pyrite.

Uraninite, the major uranium-bearing mineral, occurs as disseminations in the matrix of the interbedded siltstone-arkose layers and also near or within magnetite-ilmenite grains. Where the clasts are relatively far apart and porosity was sufficient, uraninite is in layers paralleling the outline of the pore or veinlet. Some pitchblende is present as large aggregate massive blebs with random shapes in areas of high uraninite concentration. Taylor (1978) attributes the deposition of the uraninite to a low-temperature hydrothermal replacement event associated with regional metamorphism. The pitchblende was deposited during local remobilization of the uranium. The 1979 drilling was done along two sections 400 m apart and the best intersection was 0.2% $U_3O_8$ over 0.3 m. Estimated ore reserves on the grid are 900,000 t grading 0.104% $U_3O_8$.

In 1982 and 1983, exploration concentrated on defining and tracing newly discovered trains of radioactive feldspathic quartzite boulders and one train of pitchblende nuggets and dolomite boulders containing pitchblende, hematite, sulphides and arsenides (Laporte, 1985a).

### CURRENT WORK AND RESULTS

Geological mapping and prospecting, at 1:25,000, of the eastern half of the property in 1984 confirmed that the Amer Group rocks in the area consist of three units. The lowermost unit is a sequence of thick-bedded white orthoquartzite with minor sericitic quartzite and quartz-sericite schist. It is separated from an upper sequence of feldspathic quartzite and siltstone with interbedded mudstone by a poorly exposed transitional unit including dolomite and slate. The upper unit is strongly folded and outcrops in a northeasterly to easterly trending synclinorium in fault contact to the southeast with an antiform of orthoquartzite. Syngenetic to early diagenetic uranium concentrations are fairly common in the feldspathic quartzite and siltstone sequence, but uneconomic. The boulders in the newly discovered trains contain several per cent uranium and were derived from areas where the original stratabound mineralization was remobilized into fractures during diagenesis and metamorphism.

A 74.6 line km grid was established on the Lost Lake Showing (SH claims), which was drilled in 1979,and explored with VLF-EM and magnetic surveys, geological and glacial deposits mapping, prospecting and an 801-sample soil survey. Anomalous uranium and copper concentrations in soil were detected in an area of intense cross-faulting of magnetic siltstone layers at the head of the radioactive boulder trains. The 1979 drilling fences parallel these cross-faults.

On the EX grid (SAN 18,25), the area of the train of pitchblende nuggets, 56.5 line km of gridding, VLF-EM, magnetic, gradiometric and HLEM surveys were completed over water-covered sections of the main grid and extensions to the east and south. The surveys detected a complex series of magnetometer and VLF- EM anomalies at the head of the trains. These anomalies are attributed to a thrust fault locally containing secondary iron minerals and graphite.

A feldspathic quartzite boulder train was covered by the 76.3 line km RB Hill grid (DIANA 5, KB 5, SAN 45). VLF-EM, magnetic, gradiometric,radiometric, HLEM and resistivity surveys, geological and glacial deposit mapping, prospecting and a radon-in-soil survey, using the Powell tube method, indicate that the boulders are from sandstone lenses of limited extent in the feldspathic sandstone/siltstone assemblage.

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# CHAPTER 6
# SOUTHEAST MACKENZIE DISTRICT

**Walter A. Gibbins**
**District Geologist, Arctic Islands**

## INTRODUCTION

In 1984-85, the Arctic Islands District Geologist continued to monitor mineral exploration in the southeastern District of Mackenzie. This area includes Paleozoic carbonates of the Great Slave Plain, where lead-zinc is the main exploration target, and part of the Churchill Province of the Precambrian Shield, where uranium has been the principal commodity sought. Relative to 1980-81 and 1982-83 (Gibbins, 1984, 1985), the 1984-85 field seasons saw a further decrease in uranium exploration in the Western Thelon Plain, the East Arm and Nonacho Lake areas. Lead-zinc exploration in the Great Slave Plain was also reduced as exploration was focused mainly in areas of previously discovered deposits. In contrast, there was increased exploration level for base and precious metal deposits in the Churchill Province and a continued strong exploration effort at Highwood Resources Ltd.'s niobium-tantalum-beryllium-rare earth deposits in the Blatchford Lake Complex.

## THE WESTERN THELON PLAIN

The Western Thelon Plain includes most of the Thelon River drainage basin within the eastern District of Mackenzie and corresponds to the southwestern half of the Thelon Basin (Fig. 6-1). The northern part of this area lies within the Thelon Game Sanctuary, where mineral exploration is not permitted. The southern part, which is extensively covered by glacial deposits (Craig, 1964) has been intermittently explored for uranium since 1969 (Laporte, 1974a,b, 1979, 1981; Gibbins, 1983a,b, 1984, 1985).

The Dubawnt Basin is a large, structural-sedimentary basin defined by the various units of the Helikian (Middle Proterozoic) Dubawnt Group, (Curtis and Miller. ( 1979), Miller and others, (1985) and Miller and Le Cheminant (1985). In the Western Thelon Plain, the lower and middle units of the Dubawnt Group are absent, and the Thelon Basin is characterized by sparse flat-lying outcrops of the Thelon Formation, the upper unit of

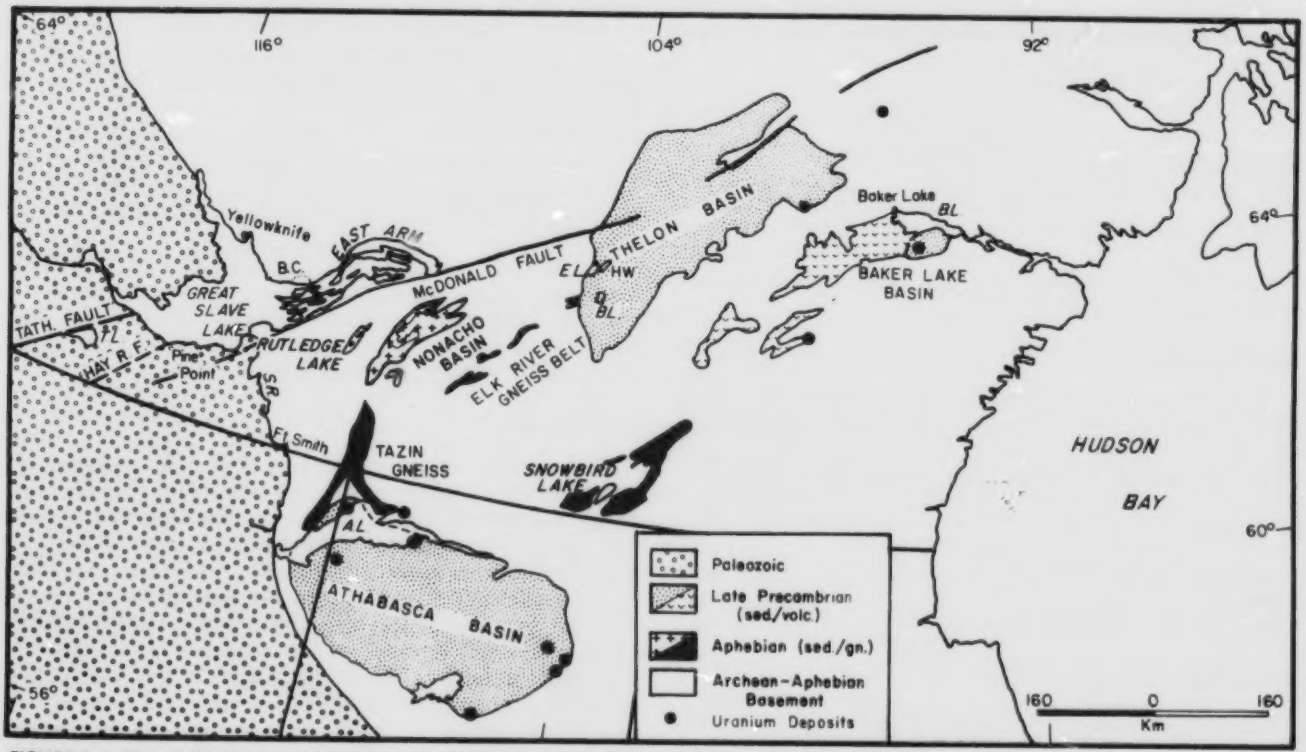



*FIGURE 6-1: Map of the Southeast Mackenzie District, Dubawnt and Athabasca Basins. BL - Beaverhill Lake, EL - Eyeberry Lake, AL - Lake Athabasca, BC - Blatchford Complex, HW - Hurwitz quartzite, SR - Slave River.*

the Dubawnt Group. It consists mainly of sandstone (quartz arenite and ortho-quartzite) and includes a basal conglomerate associated with pebbly sandstone and volcanic-rich lithic sandstone (Donaldson, 1965, 1969). A well-developed regolith is generally present at the contact between the Thelon Formation and underlying Aphebian-Archean basement (Table 6-1). Small outliers of Thelon Formation are common near the margin of the Thelon Basin. An inlier of white quartzite that has tentatively been correlated with the Aphebian (Lower Proterozoic) Hurwitz Group (Table 6-1) forms a prominent ridge northeast of Eyeberry Lake (HW in Fig. 6-1; Wright, 1967; Eade 1981).

The Thelon Formation is similar to, and possibly correlative with, the Athabasca Formation of northern Saskatchewan. The Athabasca Basin has been the focus of intensive uranium exploration for several years, and numerous uranium deposits and showings have been found.

The basement rocks are intrusive granites and granodiorites separated by belts of metasedimentary and metavolcanic gneisses of Lower Proterozoic age (1.6 to 1.8 Ga B.P.). The latter are considered favourable targets for unconformity-related uranium deposits of the Key Lake-Rabbit Lake type (Dahlkamp, 1978).

By 1984-85 only one company, PNC Exploration (Canada) Co. Ltd., was active in the Thelon Basin. They had two projects in the southwestern Thelon Basin, one near Eyeberry Lake and "Dunkel Lake" (Fig. 6-2); the other in the eastern Thelon Basin at Marjorie Lake, in the district of Keewatin (see Chapter 5).

*TABLE 6-1: FORMATIONS - WESTERN THELON PLAIN*

| | |
|---|---|
| Diabase and related dike rocks | |
| DUBAWNT GROUP: | dolostone; silicious dolostone; basalt |
| Thelon Formation: | sandstone; pebbly sandstone, conglomerate; minor siltstone, mudstone unconformity (regolith) unconformity (regolith) |
| HURWITZ GROUP: | quartzite; minor siltstone |
| Aphebian Basement: | ultramafics; mafic, intermediate and felsic gneiss; pelitic and calcareous gneiss; intrusive rocks (granite, granodiorite, undifferentiated granitoid gneiss and Muskeg Lake Granite) |
| Archean Basement: | gabbro, diorite, quartz diorite, granodiorite, granite |

## EYEBERRY LAKE PROJECT
## PROSPECTING PERMITS 1022, 1071, 1072

PNC Exploration (Canada) Co. Ltd.
Box 11571
2401-650 W Georgia St.
Vancouver, B.C., V6B 4N8

Uranium
75 I/15; P/1,2
63°15'N, 104°30'W

### REFERENCES

Craig (1964); Donaldson (1969); Gibbins (1984, 1985); Taiga Consultants Ltd. (1980); Laporte (1981); Miller (1983); Wright (1967).

DIAND assessment reports: 081399, 081824, 081958.

### PROPERTY

| | |
|---|---|
| Prospecting Permit 1022 | 75 P/2 SE |
| Prospecting Permit 1071 | 75 P/1 SW |
| Prospecting Permit 1072 | 75 I/15 NE |

### LOCATION

The permits are south and east of Eyeberry Lake (Fig. 6-2). Eyeberry Lake is 120 km west of Dubawnt Lake and 500 km east-northeast of Yellowknife.

### HISTORY

Prospecting Permit 1022 was granted to PNC Exploration (Canada) Co. Ltd. in February, 1984. Prospecting Permits 1071 and 1072 were granted in 1985. The mineral rights to Permit area 1022 (75 P/2 SE) were previously held by Union Oil Co. of Canada Ltd. as Prospecting Permit 665 from 1980 to 1983 (Gibbins, 1984, p. 224), by Urangesellschaft Canada Ltd. as Prospecting Permit 383 from 1976 to 1979 (Laporte, 1981), and by Canadian Gridoil Ltd. as Prospecting Permit 97 during 1969-70.

Prospecting Permit 1071 (75 P/1 SW) was previously held by Urangesellschaft Canada Ltd. as Prospecting Permit 636 (1979-81). NTS area 75 I/15 NE (Prospecting Permit 1072) was previously covered by Prospecting Permit 382 by Urangesellschaft Canada Ltd. from 1974 to 1978 and Prospecting Permit 91 by Esperanza Oil Co. Ltd. (1969-70).

From 1979 to 1980, Gulf Minerals Canada Ltd. explored the area immediately north of Prospecting Permit 1071 (NTS 75 P/1 NW, P/8 SW).

Gulf Minerals Canada Ltd. did heliborne VLF-EM, HLEM, radiometric and magnetic surveys, resistivity, spectrometry and Track Etch surveys, lake sediment, lake water, soil and till sampling, prospecting, mapping and diamond drilling (Gibbins, 1983, 1984).

Gulf Minerals Canada Ltd. intersected 400 m of Thelon Formation sandstone and 400 m of serpentinized, iron sulphide- and magnetite-bearing ultramafic rocks in one hole (JP-4) centred on pronounced and coincident gravity and magnetic anomalies (DIAND assessment report 081399).

### DESCRIPTION

The permit areas are underlain by Thelon Formation sandstone resting unconformably on basement granites and paragneiss (Wright, 1967; Donaldson, 1969; Taiga Consultants Ltd., 1980). This unconformity is the prime target of most of the uranium exploration in the region. The Thelon Formation consists of clay-rich, medium- to very coarse-grained ortho-quartzite, that may contain beds of radioactive, red, phosphatic sandstone. Small amounts of uranium may be present with the hematite-apatite (phosphate) matrix (Miller, 1983). The presence of a number of inliers of basement rocks suggest vertical movement on various faults that post-date the Thelon Formation.

Northeast of Eyeberry Lake, a prominent north-northeasterly trending ridge of white quartzite extends 13 km from Eyeberry Lake to a small lake informally known as "L Lake" (Wright, 1967; Taiga Consulting Ltd., 1980). This ridge is typical of and traditionally correlated with the white quartzite (unit 9 of Wright, 1967) of the Aphebian age Hurwitz Group. However,

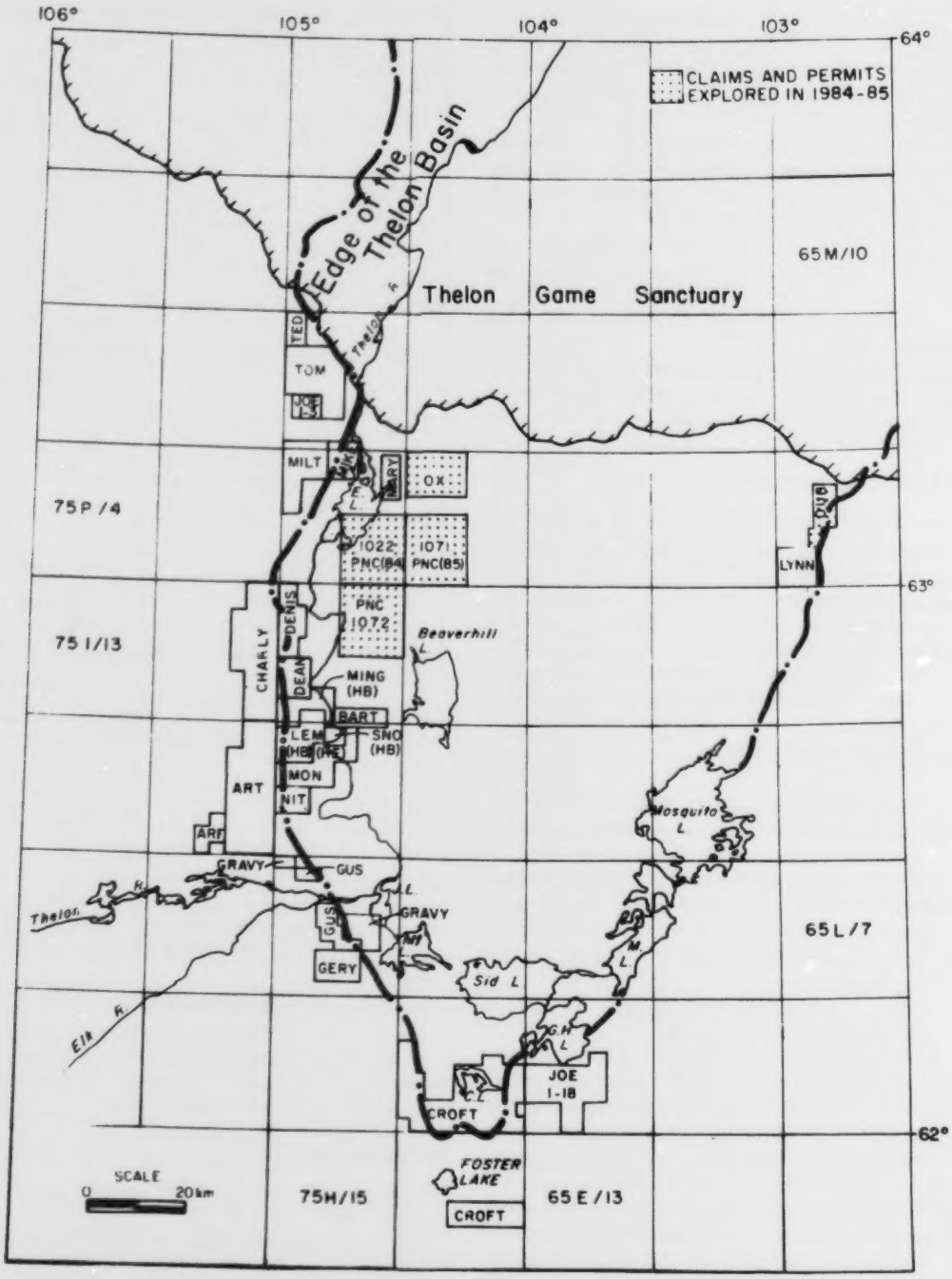



*FIGURE 6-2: 1984-85 claims and permits - Western Thelon Plain. JL - Jim Lake, GHL - Gravel Hill Lake, ML - Mary Lake, MtL - Mantic Lake, UG - Urangesellschaft Canada Ltd., HB - Hudson Bay Oil and Gas Ltd., PNC - PNC Exploration (Canada) Co. Ltd.*

*Urangesellschaft Canada Ltd. claims:*

| | | | | | |
|---|---|---|---|---|---|
| ARF 1-2 | 75 I/10,15 | JOE 1-3 | 75 P/7 | MILT 1-10 | 75 P/2 |
| BART 1-8 | 75 I/15 | LYNN 2-6 | 65 M/2 | GUS 1-10 | 75 I/7 |
| DEAN 1-6 | 75 I/15 | TOM 1-14 | 75 P/7 | JOE 1-18 | 75 I/10 |
| DENIS 1-7 | 75 I/15 | MARY 1-4 | 75 P/2 | ART 1-25 | 75 I/11 |
| GERY 1-12 | 75 I/7 | MIKE 1-5 | 75 P/2 | CHARLY 1-20 | 75 I/14 |

*Hudson Bay Oil and Gas claims:*

| | | | | | |
|---|---|---|---|---|---|
| LEM 1-13 | 75 I/10 | MING 1-11 | 75 I/15 | MON 1-11 | 75 I/10 |
| SNO 1-5 | 75 I/10 | AN 1-3 | 75 I/15 | NIT 1-5 | 75 I/10 |

*PNC Exploration (Canada) Co. Ltd. claims:*

| | |
|---|---|
| CROFT 1-29 | 75 I/1 |
| CROFT 30-35 | 75 H/16 |
| OX 1-20 | 75 P/1 |
| DUB 1-6 | 65 M/2 |

the type area of Hurwitz Group rocks is many kilometres to the east. The topographic and geophysical expressions of this ridge indicate that it is a horst block uplifted above the overlying Thelon Formation sandstones along parallel faults that extend into the basement.

The basement to the Thelon Formation in the region of the permits is thought to contain Aphebian metasediments. Regional correlations suggest some of the Aphebian metasediments may be pelitic and/or graphitic in composition, a geological setting considered favourable for unconformity vein uranium deposits. In 1983, drilling by Urangesellschaft Canada Ltd. on the LEM claims, about 15 km south of Permit 1072, intersected graphite with uranium and gold, in the "Elk River gneisses" (Gibbins, 1985, p. 212).

Bedrock in the area is covered by extensive glacial deposits, including eskers, drumlins, till and paleostrandlines of post-glacial Lake Thelon (Craig, 1964).

## CURRENT WORK AND RESULTS

In the summer of 1984, PNC Exploration (Canada) Co. Ltd. contracted Questor Surveys Ltd. to fly Prospecting Permit 1022 and adjacent areas with their MARK VI INPUT EM system. Several grids were established on the permits (Fig. 6-3) and magnetometer-gradiometer, VLF-EM and DEEPEM surveys were done between the spring of 1984 and the fall of 1985. Reconnaissance geological mapping, boulder prospecting and lake sediment surveys were done during the summers of 1984 and 1985. Track Etch and Max Min II horizontal loop EM surveys were tried in selected areas.

**1984:**

The INPUT EM survey consisted of 2,172 km of line within a 17 by 25 km area. Magnetic gradients appear to reflect the contact between the Thelon Formation sandstone and basement granitic gneisses and a thickening of the Thelon Formation sandstone to the southeast. A number of discrete magnetic anomalies found throughout the east half of the survey area are believed to represent mafic intrusions in the crystalline basement. A linear magnetic feature trending northwesterly from the southeast corner of the survey area to Eyeberry Lake is interpreted as a mafic dyke.

The most anomalous area shown by the EM profiles coincides with "742 Lake" in the northeast corner of the survey (Grid C). However, this anomaly appears to be caused by unconsolidated lake sediments. Eyeberry Lake covers numerous weak EM responses that are thought to be derived from unconsolidated surface material.

Grid A was constructed east of Eyeberry Lake over a weak north-trending conductor. Grid B covers a possible extension of this trend. In the southeast part of the area (Grid D), a river and ponds may account for increased conductivity producing irregular EM anomalies.

Two small ponds and a bay of "742 Lake" correspond to anomalies in Grid E (Fig. 6-3).

The most encouraging follow-up results are from Grid A, in the north- central part of Prospecting Permit 1022, where both VLF-EM and DEEPEM conductors were detected. Results from Grids B and C follow-up did not reveal any promising targets.

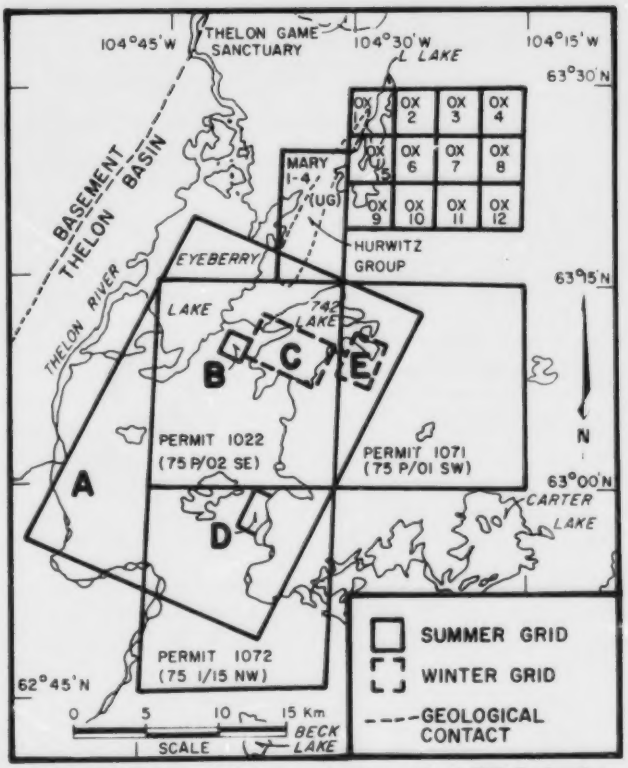



*FIGURE 6-3: Eyeberry Lake area, exploration grids of PNC Exploration (Canada) Ltd.*

**1985**

Grid C (PP 1022) covers the southwest part of "742 Lake" and Grid E (PP 1071) covers the eastern most end of "742 Lake". Follow-up geophysical surveys on Grids C and E revealed only a few weak anomalies characteristic of shallow, horizontal, conductive lake-sediments.

Work on Grid D (PP 1072) is confidential at the present time.

## DUNKEL LAKE PROJECT - DUB CLAIMS

PNC Exploration (Canada) Co. Ltd.
2401 - 650 W. Georgia St.
Box 11571
Vancouver, B.C., V6B 4N8

Uranium
65 M/2
63°07'N, 102°48'W

### REFERENCES

Eade (1981); Gibbins (1984, 1985); Laporte (1974, 1979); Wright (1967).

DIAND assessment reports: 081831, 081958.

### PROPERTY

DUB 1-6.

### LOCATION

The claims are 30 km west of Dubawnt Lake. They are immediately north of Urangesellschaft Canada Ltd.'s former LYNN claims and south of the Clarke River that defines the

southern boundary of the Thelon Game Sanctuary in this area (Fig. 6-2).

"Dunkel Lake" is an unofficial name for a 20 by 7.5 km lake at 63°00'N, 102°47'W. The area is about 580 km due east of Yellowknife and 360 km west-southwest of Baker Lake.

## HISTORY

NTS area 65 M/2 was held as Prospecting Permit 128 by Canadian Delhi Oil from 1969 to 1970 (Laporte, 1974); Permit 373 by Urangesellschaft Canada Ltd. from 1976 to 1978 (Laporte, 1979); and Permits 715 and 751 by Hudson's Bay Oil and Gas Ltd. from 1980 to 1983 (Gibbins, 1984). DUB 1-6 were staked in February 1984.

From 1982 to 1984, PNC Exploration (Canada) Co. Ltd. did reconnaissance exploration work in the Dunkel Lake area. The work included magnetic, EM and scintillometer surveys, boulder prospecting, geological mapping, and rock, overburden, lake bottom and stream sediment sampling. Petrographic work and aeromagnetic interpretation were contracted out to consulting firms (Gibbins, 1985). Three grids were established: Grid A on DUB 4, Grid C on DUB 6 and Grid B immediately west of DUB 6.

Boulder prospecting in 1982-83 identified three west-northwesterly trending boulder trains of radioactive Thelon Formation in the areas of Grid A, Grid B and the former GRIZ 1 claim of Esso Minerals Ltd. Several boulders of radioactive basement rocks were also discovered, but are believed to have been transported a considerable distance from their source.

Both soil and lake sediment samples outlined an anomalous area on Grid A.

## DESCRIPTION

The project area lies along the eastern boundary of the southwestern Thelon Basin, just south of the Thelon Game Sanctuary (Fig. 6-2). Basement rocks of Archean (Eade, 1981) or Aphebian (Wright, 1967) age underlie the eastern part of the claim group, while shallow-dipping Thelon Formation sandstone and conglomerate cover the western portion. North-northwest-trending diabase dykes are the youngest rocks in the area.

Radioactive zones of hematized sandstone were found on the expired adjacent LYNN claims by Urangesellschaft Canada Ltd. in 1980 (Gibbins, 1984, p. 210).

The basement rocks, probably Archean or Aphebian age, have been regionally metamorphosed to epidote-amphibolite and amphibolite facies. These include a north-northeast-trending paragneissic belt and orthogneissic complex, within which augen gneisses mark areas of major fractures. The basement rocks are generally of low radioactivity. These basement rocks are not favourable for hosting Lone Gull-type uranium deposits, but may be favourable for Athabasca-type unconformity vein-type uranium mineralization.

A sub-Thelon Formation regolith, up to 10 m thick, outcrops below the trace of the sub-Thelon unconformity. Radioactivity is typically less than 250 c/s SPP2, but can locally attain 500 c/s or 800 c/s SPP2.

The Thelon Formation has been subdivided into quartz arenite and lesser subarkosic sandstone, pebbly sandstone and intraformational conglomerate, and basal conglomerate. Radioactivity measures up to 500 c/s SPP2 and it is not uncommon for these rocks to contain 0.002-0.015% $U_3O_8$, up to 13.74% $P_2O_5$ and up to 0.040% $ThO_2$.

Fracture trends are recognizable as photo-geological lineaments. Easterly faulting was followed by northerly, then (finally) northwesterly faulting. Northwest-striking block faults exhibit both strike-and dip-slip displacements and offset the erosional trace of the sub-Thelon Formation unconformity in the west-central portion of the area. The Thelon Formation exhibits subhorizontal (0°-10° west dipping) bedding with variable strike directions. Subvertical joint sets, in both basement and Thelon Formation, are associated with high radioactivity and elevated U contents, especially within the latter rocks. An idealized cross-section for the Dunkel Lake area was constructed.

Chlorite, carbonate, sericite and saussurite alterations are present in the basement rocks. The saprolitic regolith is marked by hematite, kaolinite and sericite alterations. The Thelon Formation rocks here were subjected to hematite, limonite, sericite and (rare) illite alteration.

## CURRENT WORK AND RESULTS

Coincident magnetic, electromagnetic, geochemical and radiometric anomalies in Grid A showed that this area has the highest potential for uranium. In 1984, follow-up work outlined geophysical, geochemical, Track Etch, radon and radon emanometer anomalies on Grid A. However, results from the other grids were discouraging.

The age of two samples of basement rock suggest the latest isotopic re-setting was 1,700 to 1,800 Ma B.P. A lithogeochemistry study showed U to be strongly correlated with Co and weakly with Ni and As.

The major thrust of the 1985 season was drilling (15 holes totalling 1,560.9 m) on Grid A (the northeast quarter of DUB 4). A few more line kilometres of magnetic and VLF-EM surveys were completed and a second Track Etch survey and multi-element soil and drill core lithogeochemisty studies were performed. The results of drilling and Track Etch work on the grid are confidential at press time.

# NONACHO BASIN

The Nonacho Group is a conformable sequence of mainly continental sediments, consisting of conglomerates, lithic sandstones (arkose) and shales (Table 6-2), that have been deposited in an intracratonic, fault-controlled basin. They appear to be Middle Aphebian in age and are comparable to the Martin Group of northern Saskatchewan. Basement rocks are mainly Early Aphebian to Archean granites and gneisses, including numerous mylonite or cataclasite zones. A belt of Archean to Aphebian Tazin Group paragneisses extends northward from Saskatchewan into the Hill Island Lake area (Mulligan and Taylor, 1969; Bostock, 1984). Diabase dykes represent the last Precambrian events.

The geology of the Nonacho Lake area is summarized by McGlynn and others (1974), and studied in detail by Aspler (1985). Uranium-bearing minerals associated with granitic rocks include pitchblende and allanite. Within the Nonacho Group, uranium is found as pitchblende in narrow fracture fillings and small veinlets in quartz stockworks, commonly in deformed rocks.

*TABLE 6-2 STRATIGRAPHY OF THE NONACHO GROUP FROM ASPLER, 1985*

SPARROW DIABASE

INTRUSIVE CONTACT 1.7 Ga

TALTSON FORMATION
- red pelite member
- sandstone member
- pebbly sandstone member

THEKULTHILI FORMATION
- granite clast member
- milky quartz clast member
- quartz-arenite clast member
- polymictic clast member

NEWSHETHDEZZA FORMATION

CHIEF NATAWAY FORMATION
- intraformational sandstone breccia/conglomerate member
- conglomeratic member
- sandstone/mudstone member
- mixed member
- carbonate member
- siltstone member

TRONKA CHUA FORMATION
- pebbly pelite member
- drab mudstone member
- polymictic pebbly sandstone member
- monomictic pebbly sandstone member

HJALMAR FORMATION
- mudstone/carbonate member
- rhyolite member
- conglomeratic sandstone member
- breccia conglomerate member

UNCONFORMITY

UNDIFFERENTIATED ARCHEAN AND/OR APHEBIAN

Mineral exploration in the area has been sporadic over the years. Renewed interest in uranium in 1976 coincided with the release of Geological Survey of Canada Open Files 324, 325 and 326 (Hornbrook and others, 1976) which reported the results of lake sediment geochemical surveys, and the release of airborne gamma-ray survey Map 37075G (G.S.C. Uranium Reconnaissance Program, 1976). These results, combined with an earlier airborne radiometric study (Darnley and Grasty, 1972) and promising geology, resulted in considerable staking and exploration since 1976.

The 1979 level of exploration in the Nonacho area was higher than in any previous year, and several companies carried out major projects. This work included diamond drilling, airborne geophysical surveys, geological mapping and detailed systematic prospecting involving expenditures of $2 to $3 million. From 1980 to 1982, exploration tapered off, with only PNC Exploration (Canada) Ltd. working on major programs. Gibbins (1984, 1985) summarized the 1980-83 work.

Exploration was mainly for unconformity related uranium deposits similar to those found in northern Saskatchewan (e.g. Key Lake; Dahlkamp, 1978, 1979). Exploration techniques, which emphasized geophysical prospecting (Patterson and others, 1979), lake water and sediment geochemistry, and boulder tracing, are identical to those used in northern Saskatchewan. However, there is inconclusive evidence for a regolith below the sub-Nonacho unconformity.

Numerous other types of uranium occurrences, particularly Beaverlodge-type pitchblende veins related to mylonite, fine-grained mafic dykes and albitite host rocks, have been found in the area, but so far none have shown economic potential.

Bostock (1982, 1984) remapped the basement rocks south and southwest of the Nonacho Basin in NTS 75 C. Aspler (1985) mapped and studied the structure and sedimentation of the Nonacho Basin sediments.

## THEKULTHILI LAKE PROJECT

PNC Exploration (Can.) Co. Ltd.
Box 11571, Vancouver Centre
2401 - 650 W. Georgia St.
Vancouver, B.C., V6B 4N8

Uranium
75 C/13;D/16;E/1,8;
75 F/4,5,12
61°00'N, 110°00'W

### REFERENCES

Bostock (1980, 1982, 1984); Gandhi and Prasad (1980); Gibbins (1983a,b, 1984, 1985); Gibbins and others (1977); Henderson (1937, 1939a, 1939b); McGlynn (1966, 1978); Mulligan and Taylor (1969); Taylor (1971).

DIAND assessment reports: 081759, 081815 and 081908.

### PROPERTY

| | |
|---|---|
| A) MacInnes Lake - Tronka Chua Lake, | KULT 11, 52, 74, 75, 82 |
| B) Thekulthili Lake, | KULT 13 |
| C) Salkeld Lake - Hjalmar Lake, | KULT 59, 78 |

### LOCATION

These and numerous other KULT claims cover most of the Nonacho Group-basement unconformity in the Thekulthili Lake area (Fig. 6-4). This area is about 300 km southeast of Yellowknife and 160 km north of Fort Smith (Fig. 6-1).

### HISTORY

In 1977, Kenting Earth Sciences Ltd. carried out an airborne radiometric survey over the southern Nonacho Basin for PNC Exploration (Canada) Co. Ltd. The RED and NP claims were staked to protect anomalies detected by this survey. In 1978, additional reconnaissance lake-sediment and airborne radiometric surveys in adjacent areas led to the staking of the KULT claims. Detailed mapping and soil sampling were done in several areas (Gibbins, 1983a).

The 1979 program included lake sediment and soil surveys, geologic mapping, ground radiometric and VLF-EM, airborne EM and additional staking (Gibbins, 1983b). Regional mapping and radiometric prospecting were carried out over most of the claims and a number of anomalous areas was identified for more detailed work. Most of the important anomalies are associated with fractures containing prominent hematite, minor pyrite-chalcopyrite and yellow uranium oxides. Geological work shows that the Nonacho Group-basement contact is non-conformable, but locally defined by faulting.

Detailed geology, radiometric, soil geochemistry and/or radiometric surveys were done over grids cut on NP, RED and KULT 12 and 13. Uraniferous fractures were found in the basement igneous complex on Grids F and G on KULT 13.

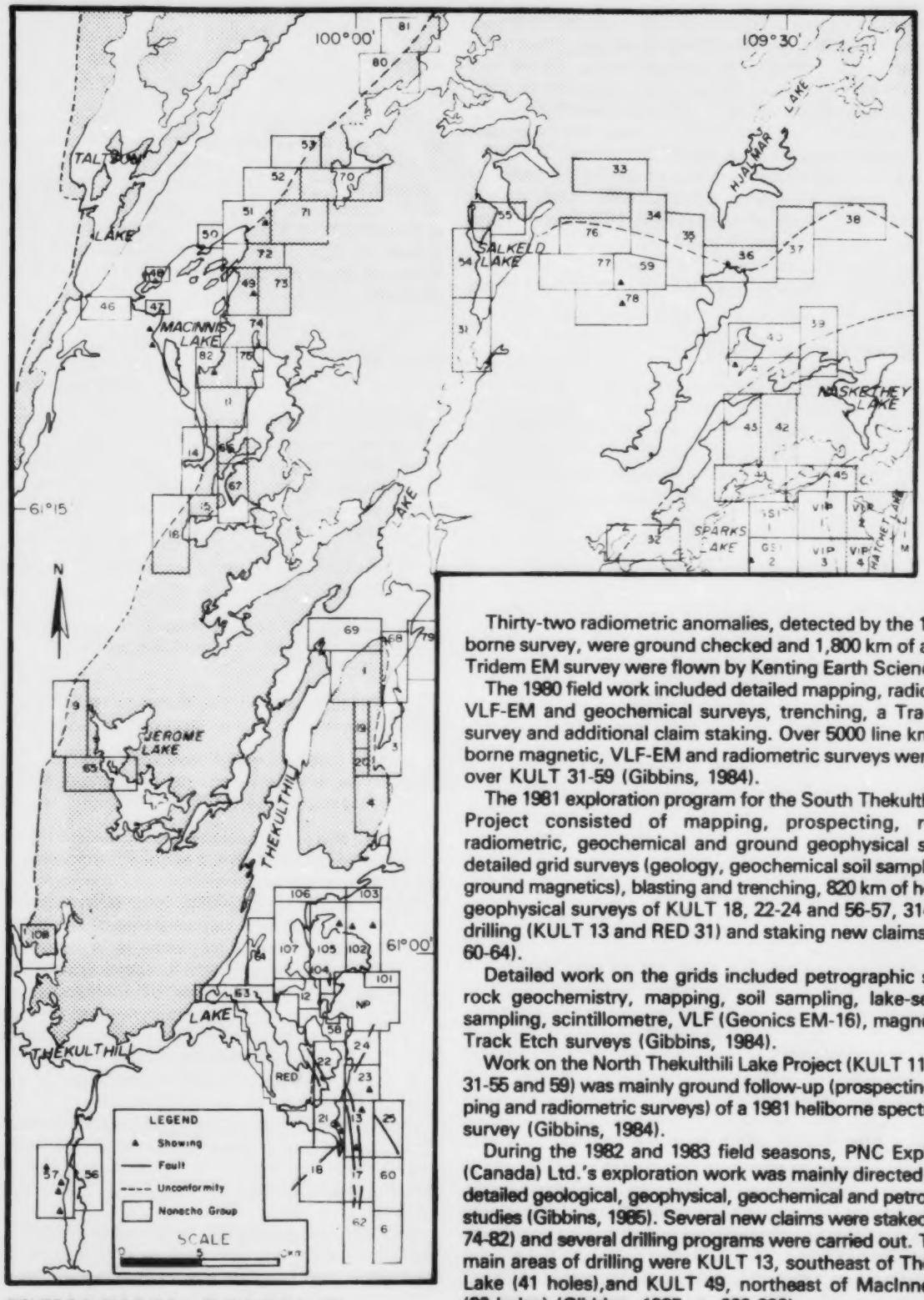



*FIGURE 6-4: KULT claims, Thekulthili Lake area*

Thirty-two radiometric anomalies, detected by the 1977 airborne survey, were ground checked and 1,800 km of airborne Tridem EM survey were flown by Kenting Earth Sciences Ltd.

The 1980 field work included detailed mapping, radiometric, VLF-EM and geochemical surveys, trenching, a Track Etch survey and additional claim staking. Over 5000 line km of airborne magnetic, VLF-EM and radiometric surveys were flown over KULT 31-59 (Gibbins, 1984).

The 1981 exploration program for the South Thekulthili Lake Project consisted of mapping, prospecting, regional radiometric, geochemical and ground geophysical surveys, detailed grid surveys (geology, geochemical soil sampling and ground magnetics), blasting and trenching, 820 km of heliborne geophysical surveys of KULT 18, 22-24 and 56-57, 3142 m of drilling (KULT 13 and RED 31) and staking new claims (KULT 60-64).

Detailed work on the grids included petrographic studies, rock geochemistry, mapping, soil sampling, lake-sediment sampling, scintillometre, VLF (Geonics EM-16), magnetic and Track Etch surveys (Gibbins, 1984).

Work on the North Thekulthili Lake Project (KULT 11, 14-16, 31-55 and 59) was mainly ground follow-up (prospecting, mapping and radiometric surveys) of a 1981 heliborne spectrometre survey (Gibbins, 1984).

During the 1982 and 1983 field seasons, PNC Exploration (Canada) Ltd.'s exploration work was mainly directed toward detailed geological, geophysical, geochemical and petrographic studies (Gibbins, 1985). Several new claims were staked (KULT 74-82) and several drilling programs were carried out. The two main areas of drilling were KULT 13, southeast of Thekulthili Lake (41 holes),and KULT 49, northeast of MacInnes Lake (22 holes) (Gibbins, 1985, p. 228-236).

## DESCRIPTION

The oldest rocks in the Thekulthili Lake area are basement granites and gneisses of Archean to Aphebian age. These rocks are unconformably overlain by conglomerate, arkose and argillite units of the Nonacho Group of undefined Proterozoic age. The Nonacho and basement rocks have been faulted and folded along north-northeast-trending axes. The youngest rocks are undeformed diabase dykes.

The area is at the mutual corners of geological maps by Henderson (1939a), Mulligan and Taylor (1969), Taylor (1971) and Bostock (1982, 1984). McGlynn (1966, 1978) mapped part of the claim area in detail; Gandhi and Prasad (1980) the MacInnes Lake area. Bostock (1980, 1982) and McGlynn and others (1974) have also discussed the geology of parts of the area.

## CURRENT WORK AND RESULTS

Summer field work in 1984 included ground geophysical, geochemical and petrographic studies, as well as geological mapping. A winter (February-May) drill program consisted of 28 holes (4,825 m) on KULT 13 and the summer work consisted of 60 holes on KULT 13, 59 74 and 82 (6,455 m). In June, 1985, 10 holes (1,385 m) were drilled on KULT 59 and 9 holes (931 m) were drilled on KULT 78 in an area east of Salkeld Lake. Work done on the KULT claims is summarized in Table 6-3.

For convenience the following descriptions of individual claim groups are classified into three geographic sub-areas: A) MacInnes Lake - Tronka Chua Lake; B) Thekulthili Lake; C) Salkeld Lake - Hjalmar Lake.

### A) MACINNES LAKE - TRONKA CHUA LAKE

**KULT 11:** 75 E/8
1°18'N, 101°10'W

KULT 11 is east and south of the south end of MacInnes Lake and covers part of the western Nonacho Group-basement contact (Henderson, 1939a). Gandhi and Prasad (1980) described the Kult and Pyramid showings on KULT 11 and KULT 14 (Fig. 6-5) as veins in basement rocks. The 1980 work on these claims consisted of detailed geologic mapping and radiometrics, rock geochemistry, trenching and sampling.

Finely disseminated pitchblende, secondary uranium and copper sulphide minerals are present in quartz-rich mylonite discovered on KULT 11 in 1979. A second radioactive area with uranium staining is 75 m to the northwest in a silicified zone at a dyke contact.

In 1982, trenching and prospecting were done on KULT 11 and 14. This work was concentrated in areas of copper-uranium-rich fractures found in silicified zones associated with altered areas of northwest-trending andesitic dykes.

## CURRENT WORK AND RESULTS

The 1983 summer field program resulted in the discovery of numerous uranium showings on KULT 82, immediately north of KULT 11 (Fig. 6-4 and 6-5). In 1984 (DIAND assessment report 081815), the KULT 82 grid was extended southward onto KULT 11.

The geology of KULT 11 is continuous with that of KULT 82. Oligomictic conglomerate in the east part of the grid is in fault contact with the basement gneiss-granite complex. No significant uranium was found in the grid area.

**KULT 52:** 75 E/8
61°27'N, 110°06'W

KULT 52 lies along the Nonacho Group-basement contact, about 2 km northeast of the northern tip of MacInnes Lake, or immediately north of KULT 51 and 71 (Fig. 6-4). In 1984, a lake-bottom Track Etch survey confirmed three anomalous radon clusters, originally detected in a 1983 survey of an unnamed lake in KULT 52. The clusters are believed to be caused by uranium along faults in oligomictic conglomerate. However, these anomalies are not believed to have economic potential.

**KULT 74, 75, 82:** 75 E/8
61°20'N, 110°10'W

The claims are on the western margin of the main area of Nonacho Group sediments. The southeast shore of MacInnes Lake runs through the western part of the area.

Uranium showings in the claim area have been divided into four types based on their host rock and mode of occurrence as follows:

1) Stockwork systems of veins in north-trending mylonite zones.
2) Stockwork-like veins in basal oligomictic conglomerate (Cole Prospect in Figure 6-5 and Gandhi and Prasad, 1980).
3) Uranium minerals distributed sporadically in fractures or disseminated within basement rocks.
4) Low-grade showings associated with dark, heavy mineral layers in the quartz-pebble sandstone unit of the Nonacho Group (Moffat Showing).

Types 3 and 4 anomalies are not considered primary targets in this area because they are sporadic, lack continuity and are generally low grade.

Numerous Type 1 showings have been mapped. The host rock, mylonite, exhibits various stages of cataclasis and relicts of psammitic gneiss. Pitchblende is in northerly to north-northeasterly trending, vertical to sub-vertical veins. Associated minerals, in decreasing order of abundance, are chlorite, hematite, calcite, pyrite, arsenopyrite and malachite.

The Cole prospect, in oligomictic conglomerate of northeast KULT 82, is a Type 2 showing. It was formerly staked as the BM claims, (Gibbins and others, 1977, p. 75; Gandhi and Prasad, 1980).

Pitchblende and secondary yellow uranium minerals fill fractures and are closely associated with calcite, and to a lesser extent, with hematite. Gold is associated with the uranium (Shell Canada Resources Ltd.; DIAND assessment report 080170).

An integrated geological, geophysical (magnetics, VLF-EM and radiometric) and geochemical (Track Etch, soil samples and radon gas) program was carried out in 1983.

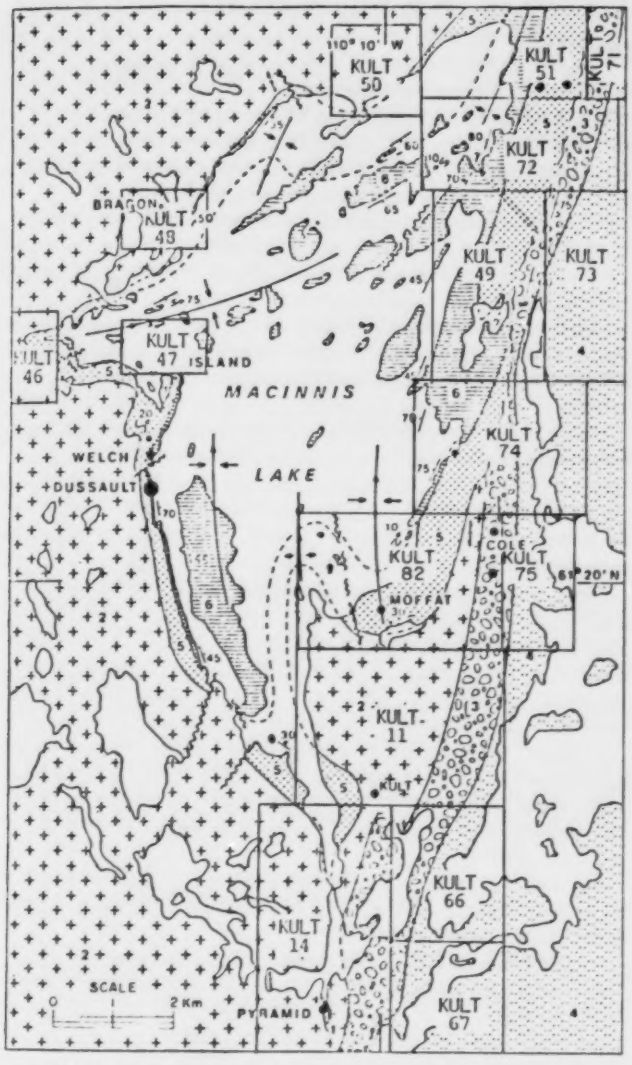


*FIGURE 6-5: Geology and uranium occurrences of the MacInnis Lake area, District of Mackenzie (from Gandhi and Prasad, 1980).*

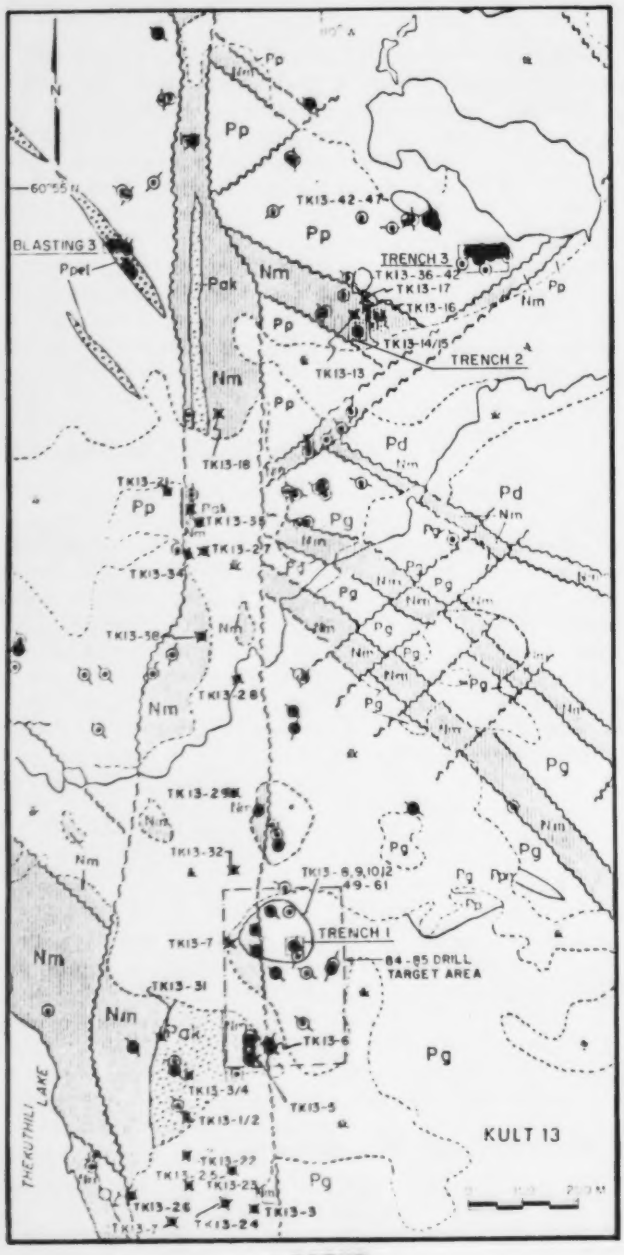
***TABLE 6-3 SUMMARY OF 1984-85 WORK ON PNC EXPLORATION (CANADA) CO. LTD. KULT CLAIMS: NONACHO-THEKULTILI LAKE area.***

| | |
|---|---|
| KULT 11 | Detailed geology - 1984 |
| KULT 52 | Track-etch (lake bottom) -1984 |
| KULT 74, 75, 82 | Emanometer - randon - 1984<br>Drilling (36 holes - 4,451 m) - 1984 |
| KULT 13 | Drilling (3 holes - 351 m) - 1984<br>Drilling (28 holes 4,825 m) - 1984 (winter) |
| KULT 59 | Drilling (21 holes - 1,652 m) - 1984<br>Drilling (10 holes - 1,385 m) - June, 1985 |
| KULT 78 | Detailed geology - 1984<br>Track-etch - 1984<br>VLF-EM - 1984<br>Magnetometer - 1984<br>Drilling (9 holes - 931.3m) - June, 1985 |

## CURRENT WORK AND RESULTS

Detailed mapping in 1984 outlined two anomalous zones in mylonite. A radon emanometre survey detected numerous readings above the threshold value, but these tended to be isolated, discontinuous and disappointing (DIAND assessment report 081815).

Thirty-six drill holes (4,452 m) probed anomalous zones previously outlined by prospecting and mapping. Most of this drilling was done on the Cole prospect (14 holes), northeast KULT 82, where uranium-rich stockwork veins occur in basal oligomictic conglomerate. A north-trending mylonite-conglomerate contact, in east-central KULT 82 (Fig. 6-5) about 500 m south of the Cole prospect, was also drilled (14 holes). An additional 6 holes were drilled on the southern extension of this trend in southeast KULT 82, and 2 holes were drilled to test a Track Etch anomaly near the center of KULT 74. The drilling showed that the conglomerate-basement contact is at least 400 m below the surface at the Cole prospect.




**LEGEND**

| | |
|---|---|
| Nm MYLONITE | Observed fault |
| Ppn AMPHIBOLITE, BIOTITE GNEISS | Inferred fault |
| Pd DIORITE | Geological contact |
| Pg GRANITIC ROCK | Swamp |
| Pak META-ARKOSE, META-CONGLOMERATE | 5000-10000cps |
| Pp PSAMMITIC GNEISS | 10000-15000cps |
| Ppel PELITIC GNEISS | >15000cps |
| | Trend of anomaly |
| | Drill hole |

*FIGURE 6-6: Geology and drill hole localities, KULT 13 claim, PNC Exploration (Canada) Co. Ltd.*

## B) THEKULTHILI LAKE

**KULT 13:** 75 C/16
60°55'N, 109°58'W

KULT 13 is immediately east of the southeastern-most tip of Thekulthili Lake (Fig. 6-4). This area contains Nonacho Group sandstone, narrow andesite dykes, mylonite and basement granite, diorite and paragneisses (Fig. 6-6).

Paragneiss underlies most of the western and northeastern parts of the claim area. Fine-grained pelitic gneiss forms concordant northwest-trending lenses in psammitic gneisses of variable lithology.

Medium-grained sandstone is distributed in lens-shaped zones within the central part of the main north-trending mylonite belt. Rare coarse and fine grained phases are present as well.

Mylonites correspond to faults and usually grade into the surrounding rocks. They trend in three directions: north, northwest and northeast. At the north and south boundaries of the claim, the large north-trending mylonite zone is 250 and 500 m wide respectively (Fig. 6-6). In places, original lithologies are preserved in the mylonite zones.

More than 40 radioactive anomalies on KULT 13 are concentrated in mylonite zones and the granitic rocks (in the south), in granitic rock surrounded by mylonites (in the central-east), or in paragneiss (in the northeast). The anomalies trend northeast, northwest and north. They are considered to be related to fault systems trending in the same directions.

Uranium minerals are generally found along fractures and are associated with chlorite, carbonates, hematite, quartz, sericite and base metal sulphides such as pyrite, galena, chalcopyrite and sphalerite. This is common in hydrothermal uranium deposits.

Eight of the main mineralized areas were surveyed, trenched and blasted in 1980-81 and twenty holes (2,942 m) were drilled and probed in 1981.

In the spring of 1982, nine holes (1,821.5 m) were drilled on KULT 13 (6 holes, TK 13-24 to TK 13-29), and adjacent northernmost KULT 17 (3 holes, TK 17- 1 to TK 17-3). The target of all the holes, except TK 13-26, was the meta-arkose unit (Pak) within the north-trending mylonite zone in central KULT 13 and 17 (see Fig. 6-6).

The arkosic sandstone found in the mylonite zone is massive and mainly medium to coarse grained. It contains poorly sorted quartz and red clast granules. Pebble-bearing layers are often encountered. The unit is in fault contact with the surrounding mylonite. It appears to pinch out south of hole TK 13-23 and does not extend into KULT 17, as was previously thought. Up to 240 ppm uranium was encountered in arkose in holes TK 13-27 and TK 13-28, but not in adjacent holes. Up to 950 ppm uranium was also detected in the mylonite that forms the footwall of the arkose in TK 13-27. There are a large number of radiometric anomalies in the footwall mylonite which are partly associated with base metal sulphides such as galena, sphalerite, chalcopyrite and pyrite (DIAND assessment report 081564).

During the 1982 and 1983 field seasons, exploration in the KULT 13 area consisted of detailed grid mapping, trenching (about 6 cubic metres), geophysics (magnetometre - 1982, VLF EM - 1983) and drilling (21 holes - 2,358.7 m in 1982 and 11 holes - 1,145.2 m in 1983). In 1982, trenches were made

in the extension of a uraniferous andesite dyke and a radioactive fracture in the dyke, and a radioactive fracture in mylonitized psammitic gneiss on KULT 23 and 24, respectively. The latter proved to be the more interesting with fracture fillings of pyrite and calcite, traces of pitchblende, chalcopyrite, galena and secondary uranium minerals. The magnetic survey outlined an andesite dyke in KULT 13, but failed to show in KULT 23. The VLF-EM survey conductors defined a zone of extreme granulation with the mylonite zones, as well as cross-cutting structures. A radon survey indicated anomalies that correspond with and confirm a 1980 Track Etch survey.

Hole TK 13-48, drilled in southern KULT 13, intersected 42 m (apparent thickness) of anomalous mylonite. Other 1982 drill holes also intersected anomalous zones, but are not considered to have economic potential due to their low grade and discontinuous nature. Follow-up drilling around TK 13-48 in 1983 indicated a 150 m long stockwork consisting of several mineralized zones at the junction of north- and east-trending mylonites. Pitchblende, hematite, chlorite and calcite occur in veins and stringers.

### CURRENT WORK AND RESULTS

In the winter months of 1984, the drilling program on KULT 13 was continued with 28 new holes, TK 13-62 to TK 13-89 (4,825 m), in the south-central part of the claim, near the boundary with KULT 17 (Fig. 6-6). Another 3 holes, TK 13-90 to TK 13-92 (351 m), in the summer of 1984 completed the drill program (DIAND assessment reports 081759, 081815).

During the past three years, 49 drill holes have been targeted in the south-central area of KULT 13, delineated as the "target area" on Figure 6-6. Drill hole spacing in the area is 50 to 100 m.

## C) SALKELD LAKE-HJALMAR LAKE

**KULT 59:** 75 F/5
61°23'N, 109°41'W

KULT 59 and the adjoining KULT 78 are between Salkeld and Hjalmar Lakes in the northern part of the project area (Fig. 6-4). Both are underlain by paragneiss, granite gneiss and other granitic rocks of the basement complex. A cataclastic zone is related to faulting in the west part of KULT 59.

A 1980 airborne survey identified numerous radiometric anomalies in the area of KULT 59. Subsequent ground surveys over some 4.3 line km of grid outlined three areas of interest with count rates from 19,500 to 28,000 cps. These zones were trenched in 1981.

Prospecting of KULT 59 identified numerous radiometric anomalies, mainly in the southwest corner of the claim. They are distributed in several zones within 500 m of a major north-northwest-trending fault and/or adjacent east-northeast-trending structures, mainly on the east side of the fault. Uranium, present as pitchblende in narrow fractures in paragneiss, prompted the staking of KULT 76-78 and the establishment of a detailed grid in the area as a base to identify lithological, geochemical and structural controls. Work included geological mapping at 1:2,500 scale, a radiometric survey, 15 line km of total field magnetics and VLF EM (Cutler and Seattle Stations), a 57-sample Track Etch survey and a 56-sample geochemical soil survey. Rock samples were collected and used to prepare 66 petrographic reports or descriptions, and 93 geochemical rock chip assays.

Three trenches were opened up in highly radioactive zones east of a large lake in the south-western corner of KULT 59. One trench gave assays of 1.36% $U_3O_8$ over 2.1 m and a grab sample of 13.98% $U_3O_8$. Alteration minerals include hematite, epidote, chlorite, sericite and carbonate.

In 1983, KULT 76-78 were prospected and mapped and several new trenches were excavated in the anomalous southwest area of KULT 59. A second type of uranium showing was recognized: a large, but low grade, disseminated type hosted in hornblende gneiss. This type of deposit is not structurally controlled.

### CURRENT WORK AND RESULTS

**Area a:** vicinity of trenches 82-3/83-4 and 83-5 (1984: 14 holes - 1,276 m; 1985: 7 holes - 1,106 m) (DIAND assessment reports 081815 and 081908). The trenches are in a large 100 by 200 m area containing numerous radiometric anomalies. They are near the intersection of two geophysically inferred fault structures that are related to major regional fault trends. Four of eight holes were drilled to test uranium mineralization associated with trenches 83-3/83-4.

Six holes were drilled in 1984 to test a uraniferous zone exposed in trench 83-5.

**Area b:** 120 m south of Area a (1984: 3 holes-179 m).

In 1984, 3 holes were drilled in this area.

**Area c:** 250 m southeast of Area a in the vicinity of trench 82-1 (1984: 4 holes - 193.6 m; 1985: 3 holes - 279 m).

In the summer of 1984, 4 holes tested for the extension of a biotite-pitchblende vein discovered in trench 82-1.

These results were confidential at the time of publication.

**KULT 78** 75 F/5
61°22'N, 109°41'W

KULT 78 is south and southwest of KULT 59 (Fig. 6-4). It is underlain by basement gneisses, mainly quartz-feldspar gneiss or migmatite and quartz-feldspar-biotite gneiss. Anomalous radioactivity was discovered in an area of swamp and felsenmeer in 1983. This area is in the northeast quarter of KULT 78.

### CURRENT WORK AND RESULTS

In the summer of 1984, the eastern half of the claim was gridded, mapped, prospected and surveyed with spectrometres (DIAND assessment reports 081815, 081908). A more detailed grid was established and additional mapping, VLF-EM, magnetic and Track Etch surveys were conducted.

In June, 1985, nine vertical holes (931 m) were drilled on the KULT 78 detailed grid.

The drill results were confidential at the publication deadline.

## OTHER CHURCHILL PROVINCE

The geology of the Churchill Province in the District of Mackenzie is known principally from the results of reconnaissance mapping. Summaries of the geology of the Churchill Province have been prepared by McGlynn (1970) and Davidson (1972b). Only recently has more detailed work become available for parts of the region (Aspler, 1985; Bostock, 1982, 1984).

Fraser (1978, p. 195) summarized the metamorphism in the area as follows:

> The northwestern Churchill Province is underlain mainly by quartzofeldspathic gneiss and sub-ordinate metavolcanic and metasedimentary rocks of Archean age which have been metamorphosed to amphibolite and granulite facies. Metamorphism to amphibolite facies probably took place during the Kenoran Orogeny. Metamorphism to granulite facies, characterized in the north, by biotite-hornblende-hypersthene assemblages, and in the southwest by garnet- cordierite-sillimenite-spinel assemblages, is possibly pre-Kenoran. Early to mid-Aphebian, greenschist to lower amphibolite facies metamorphism recognized in Aphebian strata at Great Slave Lake, may elsewhere overprint amphibolite and granulite facies rocks.

## SNOWBIRD GOLD PROJECT - PROSPECTING PERMIT 1011, BIRD 1-4 AND SNO 5 CLAIMS

Golden Rule Resources Ltd.
150, 1300-8th Ave. S.W.
Calgary, Alta., T2R 1B2

Gold, Silver
65 D/2,3,7
60°15'N,103°W

### REFERENCES

Eade (1981); Gibbins (1984, 1985); Laporte (1974b, 1983); Ridler (1971); Ridler and Shilts (1974); Schiller (1965); Taylor (1963).

DIAND assessment report: 081852.

### PROPERTY

Prospecting Permit 1011; BIRD 1-4, 7-11; SNO 5.

### LOCATION

The claims are all in the Snowbird Lake area, in the southeast corner of the District of Mackenzie, almost midway between Yellowknife (650 km to the west-northwest) and Churchill, Manitoba (550 km to the east-southeast). Geologically, the area lies at the southwest end of the Ennadai Lake-Rankin Inlet volcanic belt (Ridler, 1971; Ridler and Shilts, 1974).

Bourassa Lake is in the southwest corner of Prospecting Permit 1011. The BIRD claims are south and south-southwest of Bourassa Lake and SNO 5 is 5 to 6 km east of the center of Bourassa Lake (Fig. 6-7).

### HISTORY

There is little record of mineral exploration activities in the Snowbird Lake area, however, there is evidence of unrecorded drilling activity on the BIRD claims, presumably for massive sulfide deposits. Known mineral showings in the region include the Rochon Lake "massive sulfide deposit" (Laporte, 1983, p. 76-78); the COP gold vein (SNO 1 and 2) (Schiller, 1965, p. 14-16); and the 'N occurrence' (SNO 3 and 4) a base metal-silver vein, discovered by Canadian Homestead Oil Ltd. in 1972 (Laporte, 1974b, p. 4).

In 1969, Canadian Aero Mineral Surveys Ltd. flew a combined EM, magnetic and gamma ray spectrometer survey over NTS area 65 D/3, 4 and 7 on behalf of Canadian Homestead Oil Ltd., holders of Prospecting Permits 138 to 140. Follow up work by Trigg, Woollett and Associates on behalf of Imperial Oil Enterprises Ltd. resulted in the discovery of the N occurrence, a silver-copper-lead-zinc showing (Laporte, 1974b, p. 3-4). In 1977, Scintrex Ltd. flew EM and magnetometer surveys of NTS area 65 D/16 (Prospecting Permit 448) for Gulf Minerals Canada Ltd. (Laporte, 1983, p. 76-77).

In 1981, Golden Rule Resources Ltd. collected and analyzed 245 lake sediment samples, and identified several gold and arsenic anomalies in the area (Gibbins, 1984, p. 278-279). Follow-up work in 1982-83 included prospecting, claim staking, and sampling of favourable boulders and showings both old and new (Gibbins, 1985).

The SNO claims were staked in 1981, BIRD 1-4 in 1982 and BIRD 7-11 in 1983, and Prospecting Permit 1011 was granted February 1, 1984.

### DESCRIPTION

All of the claims and Permit 1011 are underlain by Archean sediments and volcanics of the Ennadai Lake - Rankin Inlet Belt (Ridler and Shilts, 1974; Ridler, 1971; Eade, 1981). Taylor (1963) described the volcanics as mostly basalt, but also tuffs, laminated metavolcanics and hornblende-feldspar gneiss. Most of the basalt is massive; some flows display poorly developed pillows and others show scoriaceous tops and flow top breccias. Greywacke is interbedded with the flows near Bourassa Lake. The sedimentary rocks consist of greywacke and quartzite. Most of the greywacke shows a well-developed fine lamination, but massive units are found as well. The quartzites, more extensive than the greywackes, locally show cross-bedding or, more rarely, graded bedding.

The northeasterly trending belt of supracrustal rocks, between Kasba Lake and Snowbird Lake (Fig. 6-7), lies between a prominent gravity high to the west and a gravity low to the east. A prominent magnetic high, which runs the length of the BIRD claims, is due to magnetite-oxide facies iron formation within a unit of siliceous clastic metasediments.

The supracrustal strata dip to the west with shallow to moderate dips (Fig. 6-8) and a tectonic foliation cuts the bedding at a low angle. The eastern half of the claims and permit are underlain by older mafic metavolcanics that include a high proportion of isoclinally-folded banded tuffs. Siliceous clastic metasediments, including various facies of iron formation, overlie the mafic volcanics and are intercalated with grey-

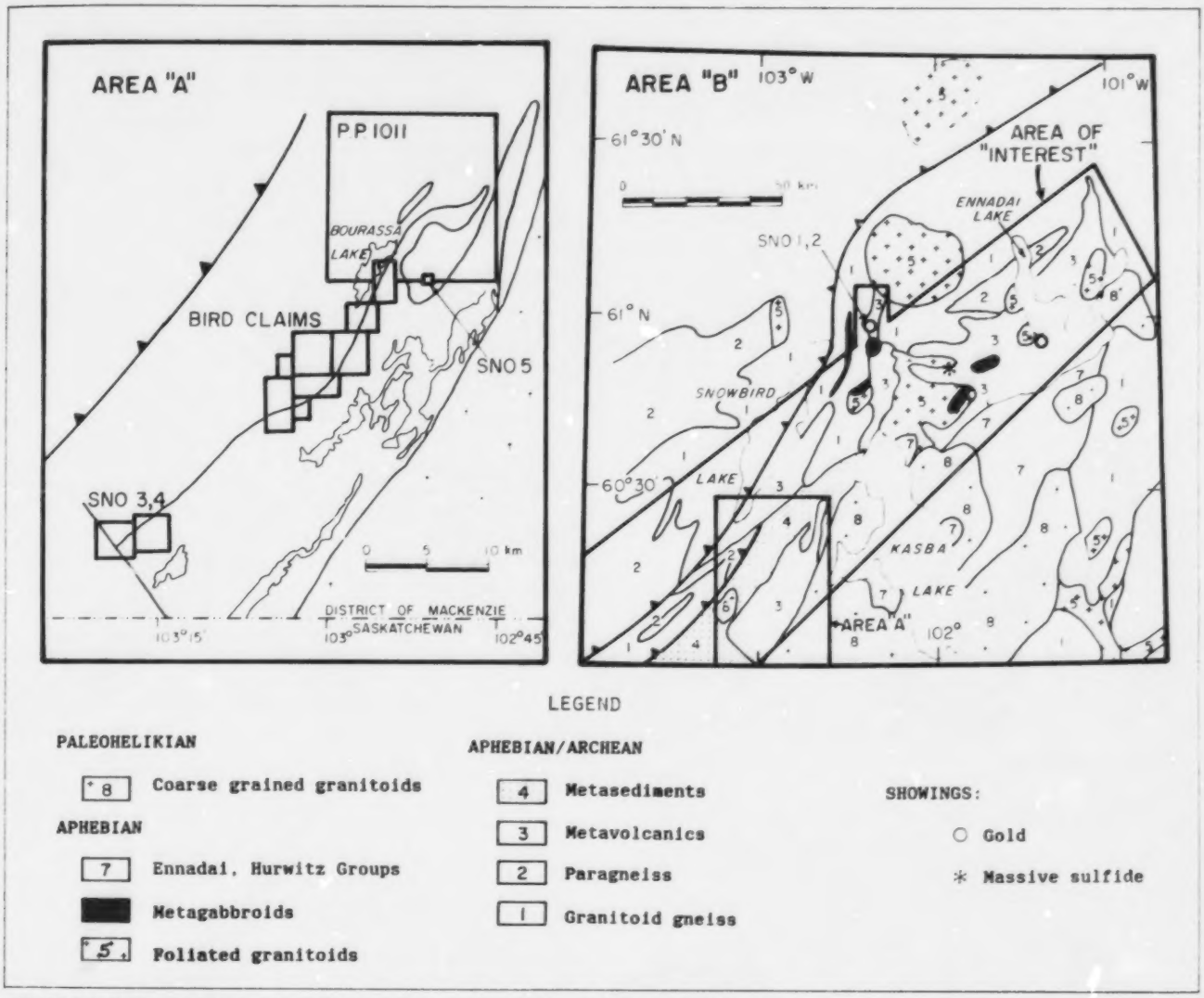



*FIGURE 6-7: Regional geology of Snowbird Lake area, showing Golden Rule Resources Ltd.'s claims and permits.*

wackes that cover the western half of the area. Deformed granitoid gneiss and migmatite post-date and enclose the volcanic-sedimentary supracrustal belts.

## CURRENT WORK AND RESULTS

In January, 1984, Anaconda Canada Exploration Ltd. obtained the right to earn a 50% interest in the mineral holdings. They undertook a summer program of geophysical interpretation of lake sediment and rock sampling, prospecting and mapping designed to test the area for gold deposits in iron formation similar to the Cullaton Lake B zone, 250 km to the northeast.

### Lake Sediment Geochemistry:

The majority of lakes sampled were of moderate depth (5 m), slightly acidic and clear (oligotrophic). Sediments were predominantly composed of a brownish-black, decomposed organic (gyttja) fraction (70-90%) and a greyish-brown clay-silt fraction (10-30%). Sediments were also characterized by restricted pH ranges (5.8-6.6) and were often encrusted with manganese and iron oxides. A total of 84 lake sediment samples were collected from two northeasterly trending magnetic highs. Trend A cuts the northwest corner of the permit area and trend B the southeast corner. Another 39

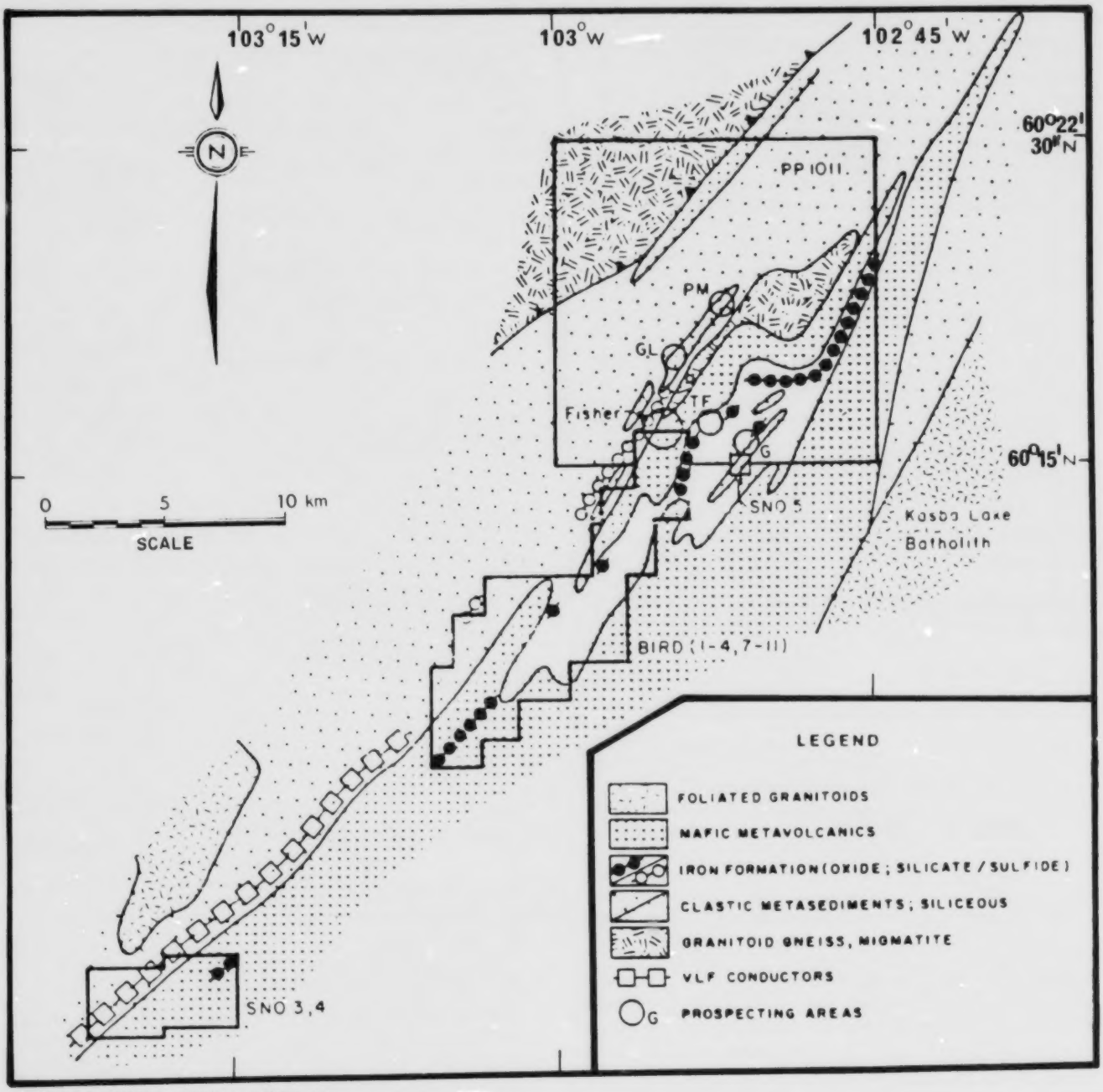



*FIGURE 6-8: Geology of SNO and BIRD claims.*

samples were collected along the sediment-volcanic contact, north of the permit area between Barr Lake and Latimer Lake. Silver contents are typically at the detection limit of 0.1 ppm and show little variability. Most (95%) of the gold assays are less than the threshold level of 5 ppb and do not correlate with arsenic content.

Trend A is characterized by spotty gold enrichment, trend B has significantly higher base metal concentrations but is relatively gold poor, and the northern contact exhibits only background levels of precious and base metals. None of these areas are considered favourable for precious or base metal prospects.

**Geology:**

Gold is associated with quartz stringers and sulphidation of magnetite in the wall rocks.

a) **TF** trend:

The TF trend is on a prominent linear magnetic high in the south-central part of Prospecting Permit 1011 (TF in Fig. 6-8).

It consists of scattered, deeply rusty weathering boulders of thinly bedded chert-magnetite iron formation and has been outlined along strike for a distance of 500 m. The boulders contain up to 20% disseminated pyrite in association with very thin conformable quartz stringers. Minor finely disseminated pyrrhotite is ubiquitous in meta-chert and meta-siltstone beds of the iron formation. This unit of oxide facies iron formation is traceable in subcrop over a stratigraphic interval of at least 25 m within a unit of siliceous metagreywacke.

The average gold content of 16 composite samples of boulders of iron sulphide-rich oxide meta-iron formation is 15 ppb. Notable assays include 625 ppb Au (sample 1151037), 80 ppb Au (sample 1151040) and 75 ppb Au (sample 1151039). Other assay results, greater than 100 ppb Au, obtained by Golden Rule Resources Ltd. from this vicinity, are reported to be from boulders of mafic metavolcanics.

b) **Gossan area:**

The gossan area is a few hundred meters north of SNO 5 claim (G in Fig. 6-8). Rusty weathering patches and horizons are easily visible from the air. Individual zones, up to 5 m wide and 50 m long, are found in a 30 m by 700 m area of mafic meta-volcanics along their contact with overlying meta-greywackes. Rusty weathering strata includes: foliated, dark green, medium- to coarse-grained, hornblende-plagioclase-quartz amphibolite and biotite-plagioclase-quartz-pyrite amphibolite (mafic tuffs); brown weathering: siliceous biotite-muscovite meta-greywacke and dark grey muscovite-graphite-quartz schist (meta-chert).

Rusty weathering areas consist of several percent disseminated pyrrhotite, lesser pyrite and trace chalcopyrite in association with very thin and conformable quartz-carbonate stringers. The average gold content of 17 grab samples from the zone is 40 ppb.

c) **PM ridge:**

Rusty weathering patches in mafic volcanics are on two northwesterly trending ridges near the center of Prospecting Permit 1011 (PM in Fig. 6-8). The rusty weathering zones are thin clastic metasedimentary units (muscovite-biotite meta-quartzwacke) ranging up to a metre in thickness and are intercalated with thinly-banded dark grey to brownish weathering metamorphosed mafic tuffs (medium- to fine-grained hornblende - actinolite - chlorite - plagioclase - quartz - pyrite amphibolite).

Rusty weathering patches are predominantly siliceous and contain up to several percent disseminated and fracture filled pyrite and pyrrhotite, lesser arsenopyrite and trace chalcopyrite associated with relatively thin (1-10 cm) conformable quartz carbonate stringers. Ten grab samples from the two ridges averaged 30 ppb Au. The best assays were from arsenopyrite-rich material.

d) **Gull trend:**

The Gull Lake trend (GL of Fig. 6-8) consists of rounded, scattered, deeply-weathered rusty boulders of amphibolite and pyrrhotite-quartz-chlorite rock interpreted as iron silicate and sulphide facies iron formation, respectively. The former contains up to 10% iron sulphides in association with conformable quartz stringers. Some quartz-rich boulders contained molybdenite. The trend has been traced along strike for 5 km.

Assays of 11 grab samples from quartz-rich boulders near "Gull Lake" is 30 ppb Au. Best results were 130 ppb, 100 ppb, and 152 ppb Au. Base metal accumulations, for all samples, averaged 1960 ppm Zn, 720 ppm Cu and 8 ppm Pb.

e) **Fisher showing:**

The Fisher showing is on an island, about 250 by 150 m in size, located on the northern boundary of the BIRD 1 claim in Bourassa Lake (Figure 6-8). Previous work, by Golden Rule Resources Ltd., established the presence of anomalous gold values in a train of pyritic, quartz-veined boulders of mafic tuff (up to 6000 ppb Au) and in associated soils (up to 55 ppb Au).

Follow-up work by Anaconda Canada Exploration Ltd. included rock sampling, mapping, prospecting and a magnetometer survey. Results of the magnetometer survey were generally flat and no discernable relationship between mineralized boulder fields and magnetic readings was observed. Although detailed prospecting failed to find bedrock, two types of boulders were recognized. Train 1, measuring 50 by 150 m and striking north by northeast (predominant glacial direction), consists of small angular boulders of dark grey to dark green, fine- to medium-grained hornblende-actinolite-quartz-pyrite amphibolite (mafic tuff). These boulders are rusty weathering, contain up to 10% coarse-grained pyrite as disseminations, and contain lesser chalcopyrite and sphalerite in association with 1-10 cm wide quartz-carbonate-tourmaline veins and stringers. The average gold content of 11 grab samples collected from this trend is 2650 ppb. The best results are 6140 and 4730 ppb Au (samples 1150021 and 1150028A, respectively). Base metal accumulations average 145 ppm Cu, 120 ppm Zn and 9 ppm Pb. Fourteen samples of grey weathering mafic tuff from boulders peripheral to train 1 returned gold values near the detection limit of 5 ppb.

## SNOWBIRD GOLD PROJECT
## SNO 3 AND 4 CLAIMS

Golden Rule Resources Ltd.
150, 1300-8th Ave. S.W.
Calgary, Alta. T2R 1B2

Gold, Silver
65 D/3
60°03'N, 103°18'W

### REFERENCES

Gibbins (1984, 1985).
DIAND assessment report: 081853.

### PROPERTY

SNO 3 and 4.

### LOCATION

SNO 3 and 4 are 15 km south of the southwest corner at Atzinging Lake and 5 to 7 km north of the southern boundary of the Northwest Territories. The claims are 170 km northeast of the village of Stoney Rapids, Saskatchewan.

### HISTORY

SNO 3 and 4 include a mineralized zone, referred to as the "N occurrence", discovered in 1971 and 1972 in Prospecting Permit 138 (Laporte, 1974b, p. 3- 4). Canadian Homestead Oils Ltd. had airborne EM, magnetic and radiometric surveys flown and contracted ground follow-up that led to the discovery of the N occurrence. The property was then option-

ed to Imperial Oil Ltd. who enlarged the grid and did geophysical and soil geochemical surveys. The soil geochemistry results were not encouraging, but none of the conductors were drill-tested.

In 1981 and 1983, Golden Rule Resources Ltd. prospected, sampled and restaked the "N occurrence" and surrounding area as part of their regional program.

### DESCRIPTION

The SNO 3 and 4 claims straddle the main northeast-trending contact between mafic metavolcanics to the southeast and overlying metagreywackes to the northwest (Figure 6-8). Outcrop exposure is poor and the claims are within a burn area. Three airborne EM conductors strike across the main trend, and may represent fault or shear zones. They appear to be associated with brecciated graphite-bearing meta-quartzite.

Minor oxide-facies iron formation is intercalated with the mafic metavolcanics. Boulders of foliated granodiorite, probably related to the Kasba Lake Stock, cover the northern part of SNO 3.

### CURRENT WORK AND RESULTS

Results from geochemical analysis of 16 lake sediment samples showed silver and several elements (U, Sr, Cd, Sb, Be and W) reflected detection limit levels. Gold content was below the regional threshold value of 5 ppb. Base metals showed apparently random spot highs. Zinc correlated well with iron and manganese as if it was involved in a scavenging process.

Boulder sampling, along the strike of a conductor that may be associated with the N occurrence, failed to give anomalous gold contents like material from the original showing.

The claims have been assigned a low priority for gold exploration.

## SNOWBIRD GOLD PROJECT
## SNO 1 AND 2 CLAIMS

Golden Rule Resources Ltd.
150, 1300-8th Ave. S.W.
Calgary, Alta. T2R 1B2

Gold, Silver
65 D/16
60°54'N,102°27'W

### REFERENCES

Gibbins (1984, 1985); Shiller (1965).
DIAND assessment report: 081851.

### PROPERTY

SNO 1 and 2.

### LOCATION

The SNO 1 and 2 claims (60°54'N,102°27'W,) are 12 km east of the north end of Snowbird Lake (Figure 6-8).

### HISTORY

The SNO 1 and 2 claims include a high-grade gold occurrence formerly staked and explored as the COP claims in 1969 and 1964. Schiller (1965, p. 14-16) reports the best assay was 169.3 g/t Au and 132.3 g/t Ag over a width of 0.5 m. Mineral rights to the area (65 D/16) were held by Gulf Minerals Canada Ltd. under Prospecting Permit 448 during 1977-1979 as part of their Ennadai Lake project (Laporte, 1981, p. 35-36), but little or no detailed prospecting or mapping was done on the permit area.

During a regional lake-sediment sampling program in 1981, Golden Rule Resources Ltd. revisited known mineral showings, found gold associated with late structures and quartz veining, and staked the SNO 1 and 2 claims (Gibbins, 1984, p. 279-280).

In 1983, detailed work on the SNO 1 and 2 claims resulted in the discovery of a fourth mineral showing, COP #4, in the north central part of SNO 1. It is similar to other showings and is related to a shear-vein system with varying amounts of quartz and various sulphide minerals. A number of outcrops of sulphide, magnetite and silicate facies iron formation were discovered in the vicinity of the claims, but significant gold assays were not encountered (Gibbins, 1985).

### DESCRIPTION

The SNO 1 and 2 claims are underlain by a northerly trending (0-020°), narrow band of mafic metavolcanics about 3 km wide and flanked by foliated granitoids. Mafic metavolcanics consist of a sequence of flows, several tens of meters thick, characterized by a gneissic, dioritic-looking amphibolite basal unit, a foliated pillowed central interval, and a laminated amphibolite upper interval. The latter is associated with oxide facies meta-iron formation and/or disseminated iron sulphides that can be garnetiferous. Meta-iron formation is rusty weathering and typically less than a meter in thickness.

Volcanics dip shallowly (30°) to the east but local reversals in dip suggest broad folds, with steep west facing limbs, modified by northerly striking sub-vertical faults. Metavolcanics are cut by a prominent set of faults/joints oriented at 100° and associated with narrow quartz stringers several centrimetres wide.

### CURRENT WORK AND RESULTS

In 1984, Anaconda Canada Exploration Ltd. geologists sampled rocks and boulders peripheral to known showings with negative results.

## EAST ARM OF GREAT SLAVE LAKE (ATHAPUSCOW AULACOGEN)

Hoffman (1977) named the East Arm area the "Athapuscow Aulacogen", a "deformed east-northeast-trending basin, 270 km long by at most 80 km wide. It contains little metamorphosed early Proterozoic sedimentary and magmatic rocks exposed in and around the East Arm of Great Slave Lake".

In January, 1985, Highwood Resources Ltd. staked the HJL claims to cover a known nickel-cobalt showing on Blanchet Island (85 H/16), (Padgham and others 1978, p. 79-80). This was the only mineral industry activity in the East Arm in 1984 and 1985.

# BLATCHFORD LAKE PLUTONIC COMPLEX

## INTRODUCTION

The Blatchford Lake intrusive suite includes all the plutonic rocks of alkaline affinity that form a coherent complex known as the Blatchford Lake Plutonic Complex. It lies at the southern margin of the Slave Province and is bounded by Blatchford Lake on the north and Hearne Channel of Great Slave Lake on the south (Davidson, 1978). Geological mapping by Davidson (1972a, 1978) led to the recognition of several units that make up a multiphase, sub-circular ring complex some 23 km in diameter or 235 km² in area, that intrudes Archean plutonic rocks and metasediments of the Yellowknife Supergroup (Fig. 6-9).

The suite shows a remarkable range in composition that developed as the rocks crystallized during a sequence of intrusive events documented by field relationships (Davidson, 1972a, 1978). Successive units range from gabbro (with anorthosite inclusions) through leuco-ferrodiorite, quartz syenite and granite to peralkaline granite and syenite (Davidson, 1982).

It is convenient to consider the Blatchford Lake Complex in two parts: the earlier, western part including the Caribou Lake Gabbro, Whiteman Lake Quartz Syenite, Hearne Channel Granite and Mad Lake Granite, and the later, more extensive Grace Lake Granite with its Thor Lake Syenite core (Fig. 6-9). It is within the later peralkaline units that rare element minerals are found (Davidson, 1982).

Isotopic determinations indicate an early Aphebian age (2,150 Ma) for the Complex (Davidson, 1982). Bowring and others (1984) obtained U-Pb zircon ages of 2175 ± 7 Ma representing an older alkaline phase (Hearne Channel Granite) and 2094 ± 94 Ma from the younger peralkaline phase, the Thor Lake Syenite.

## THOR PROJECT

Highwood Resources Ltd.
Suite 1600
540, 5th Ave. S.W.
Calgary, Alta., T2P 0M2

Be,Ta,Nb,REE,Y,$CaF_2$,
U,Th,Zr
85 I/1,2
62°07'N,112°35'W

### REFERENCES

Davidson (1972a, 1978, 1982); de St. Jorre (1986); Gibbins (1981, 1983a,b, 1984, 1985); Grasty and Richardson (1972); Smith (1985); Smith and de St. Jorre (1985); Trueman (1984); Trueman and others (1984, 1986).

### PROPERTY

THOR 1-45; NB 1-172; DISA 1-5 and REO 1-3.

### LOCATION

The claims are centered on a small lake 105 km southeast of Yellowknife, known informally as Thor Lake, which is halfway between Blatchford Lake, 5 km to the north, and Hearne Channel of Great Slave Lake, 5 km to the south.

### HISTORY

The area was staked as ODIN 1-4 in 1970 and uranium, thorium and rare earth elements were noted, but little work was done and the claims lapsed.

A government airborne radiometric survey flown in 1971 outlined a significant uranium and thorium anomaly (Grasty and Richardson, 1972). Dr. A. Davidson of the Geological Survey of Canada mapped and defined the Blatchford Lake Complex and its central core of Thor Lake Syenite in 1971 and 1977 (Davidson, 1972a, 1978).

During the fall of 1976, geologists of Highwood Resources Ltd. discovered a number of previously undiscovered mineral showings north of the original ODIN claims and staked the THOR 1-4 claims. Additional claims were added later when spectro-graphic analyses indicated quantities of niobium, yttrium and rare earth elements.

In 1977, Highwood Resources Ltd. did extensive prospecting, mapping, sampling and radiometric surveys including trenching in the T Zone and 335 m of diamond drilling in the S Zone (Gibbins, 1981). In 1978, 1091 m of drilling was done on the Lake and T Zones (Gibbins, 1983a).

In 1979, work was concentrated on the Lake Zone, where 5 trenches and 5 drill holes (136 m) were completed and sampled (Gibbins, 1983b, p. 174). Wayne Johnson of Target Exploration Services Ltd. mapped the southeast portion of the claims and did a soil radon survey over the Lake Zone in 1979. In September, a crew from the Saskatchewan Department of Mineral Resources did a lake-bottom radiometric, resistivity and bathymetric survey that defined a number of radiometric anomalies beneath the shallower parts of Thor Lake (Gibbins, 1983b).

In the spring of 1980, the claims were optioned to Placer Development Ltd., who drilled 18 holes (2000 m) mainly in the Lake Zone in 1980 and 1981 (Gibbins, 1984, Table 5-9 and Fig. 5-27, p. 277). The cores were logged, sampled, and measured for magnetic susceptibility and radioactivity. This work indicates three sub-horizontal mineralized layers, 10 to 45 m thick, within 100 m of the surface in the Lake Zone, containing 63 Mt of indicated and inferred material grading 0.03% tantalum and 0.4% niobium (columbium) with significant amounts of rare earth elements (samarium 0.1%, cerium 1%, lanthanum 0.6%) and zirconium 3.5% (Highwood Resources Ltd., Annual Report 1981). The T Zone contains 1.15 Mt of 0.55% $Nb_2O_5$ inferred with a further 5.5 to 7 Mt probable. Some 67,000 t of 1.5% $Nb_2O_5$ and 0.05% $U_3O_8$ are drill inferred in the S Zone, and an equal amount of similar grade is possible (Highwood Resources Ltd., Annual Report, 1980).

Other work done in 1980 included line-cutting, VLF-EM and radiometric surveys. New trenches were blasted south of the T and S Zones and all previous trenches were cleaned and resampled. Laboratory testing included petrographic, scanning electron microscope (SEM), lithogeochemical and bench tests to study the alteration, ore mineral composition and paragenesis to learn more about the geology and metallurgy of the deposit.

Placer Development Ltd. relinquished the option in the spring of 1982. Highwood Resources Ltd. resumed the role of operator, shipped a 4500 kg sample for metallurgical tests and did magnetometer and scintillometer surveys along the southern limits of the property.

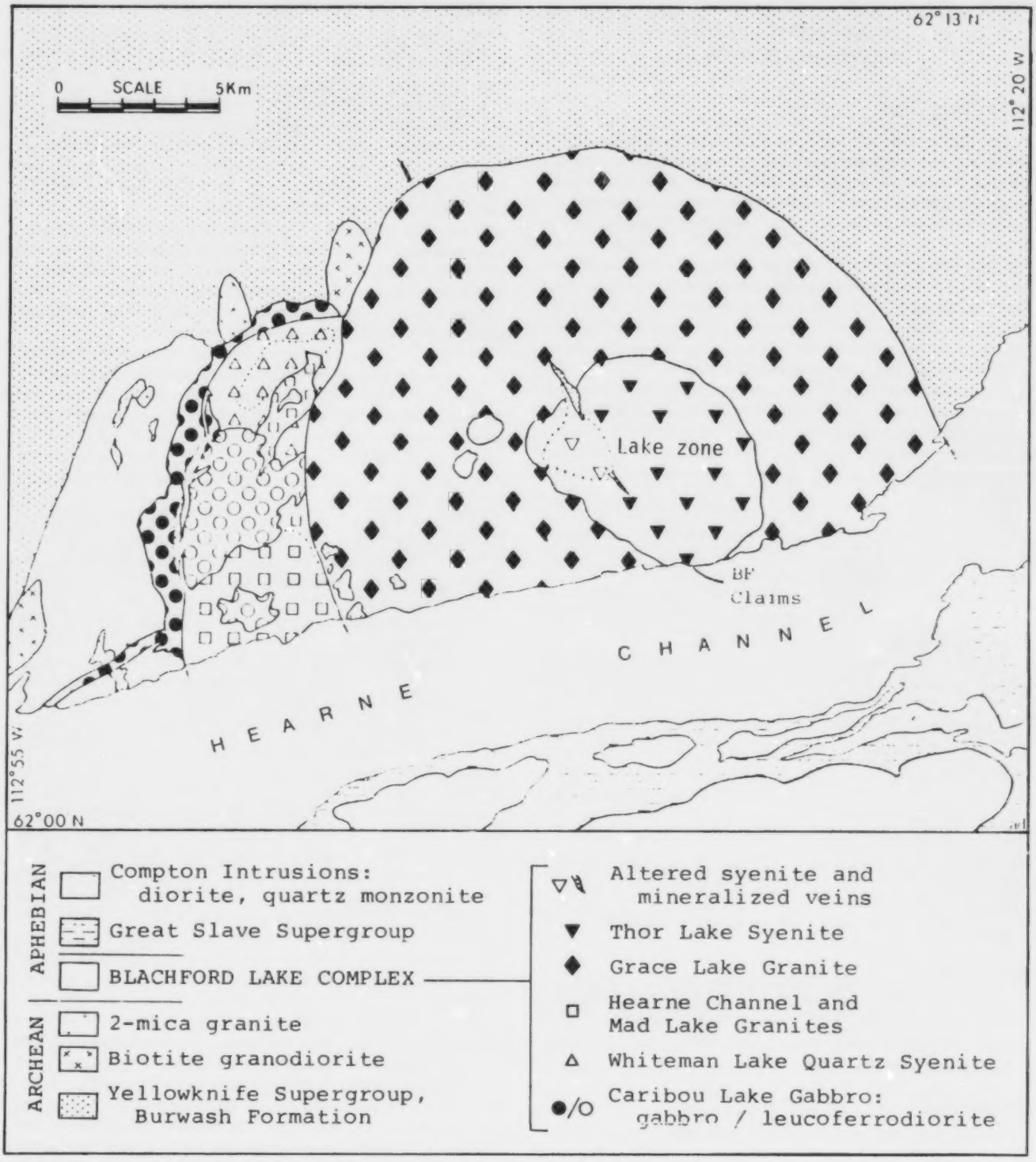



*FIGURE 6-9: Geology of Blatchford Lake Complex (from Davidson, 1982).*

**T Zone:**

Following the recognition of important beryllium potential in the T Zone in 1983, exploration work was directed mainly towards defining grades and tonnages of this element. Work included re-logging previous drill core from the T Zone, detailed geological mapping (Fig. 6-10), an orientation lithogeochemical survey to identify pathfinder elements, berylometer surveys of core and outcrops, stripping and trenching for bulk samples and a major drilling program from October 1983 to March 1984. The drilling outlined some 415,000 t of 1.0% BeO in the North T Zone and 1,180,000 t of 0.66% BeO in the South T Zone for a total of 1,595,000 t of 0.75% BeO to an approximate depth of 61 m (200 feet). A total of 4,174 m was drilled in 72 holes during the winter of 1983-84. Thirty-nine of these holes or 2,009 metres were drilled during 1983. The first two holes in the North T Zone intersected 21.3 m of 2.21% BeO, 3.0 m of 1.40% BeO, 21.6 m of 2.38% BeO, 4.6 m of 0.70% BeO and 12.2 m of 2.33% BeO. A 1,000 lb (456 kg) bulk sample from a pit in this area assayed 0.93% BeO over a length of 18.3 m. A second trench, 500 m south, assayed 1.61% BeO over a 19.8 m (65 foot) length. A total of 76 $m^3$ (2,675 cubic feet) was removed by trenching (Gibbins, 1985 and Trueman and others, 1984).

**Lake Zone:**

A gravity survey of the Lake Zone was completed in the spring of 1983 to provide insight as to the attitude of the mineralized zones. Modelling of the resulting Bouger gravity anomaly suggests that the tantalum-niobium-rare earth zone extends downward in the form of an inverted cone for several hundreds of feet (Trueman, 1984).

Structural studies of ultra-mylonite observed in core and outcrop, as well as offsets of lithologies, have indicated several fault systems that help explain and confirm the form of the deposits.

Three holes (465 m) drilled in the Lake Zone in the spring of 1984 indicate a greater tonnage than the previously published reserve of 63 Mt probably exist at depth.

Metallurgical studies, based on oil-phase extraction techniques to recover very fine-grained tantalum-niobium minerals, continued during 1983 and 1984.

## DESCRIPTION

The claims cover the central core of the Blatchford Lake Plutonic Complex known as the Thor Lake Syenite. Davidson (1978) mapped five distinct sub-units of the Thor Lake Syenite. A sixth unit of altered and poorly exposed syenite outcrops around and south of Thor Lake (the Lake Zone, Figs. 6-9, 6-10). It is altered by replacement of hornblende with fine aggregates of hematite, albite, fluorite and pale biotite. Davidson (1978) interpreted this as intense alteration of pre-existing syenites, possibly developed under the influence of a late-stage magmatic vapour phase related to, though probably slightly later than, the emplacement of pegmatites and acmite-albite veins to the east.

A zone of black rocks containing veins and irregular masses of pink to buff- coloured fluorite-albite, known as the T Zone, extends north-northwest of Thor Lake for 1250 m. It cuts through the outer syenite contact into the Grace Lake Granite. The F or Fluorite Zone may be a southern extension of this zone. Similar rocks are associated with narrow systems of syenite pegmatite and acmite-albite veins extending east-northeast from the southern exposed part of the T Zone, referred to as the R and S Zones. All of these zones contain Nb, Ta and REE mineralization, along with high concentrations of Na, Zr, F, Be and locally Y, Th and U (Davidson, 1982).

The Lake Zone, where Placer Development Ltd. concentrated their work, is a 2 $km^2$ triangular-shaped area of dark, altered and brecciated rock beneath and south of Thor Lake (Fig. 6-10). According to Placer Development Ltd. geologists, brecciation is the dominant feature of the core. Syenite and pegmatitic syenite have mortar texture, some specimens display a streaming of crystal and rock fragments and locally, there are rebrecciated breccias. "Extensive biotite flooding appears as a 'sea' of fine-grained, felty, matted biotite with crystal and rock fragment 'islands'. Zircon flooding is local and is marked by 30 to 50 percent zircon as crystal aggregates."

Petrographic work shows that the tantalum and columbium are present as columbo-tantalite in altered syenite. Bastnaesite, (a cerium-lanthanum fluoro-carbonate), allanite, perthitic feldspar, albite, fluorite, carbonate, green muscovite, biotite, and pseudomorphs after mafics and opaque minerals are also present. Columbo-tantalite occurs as discrete grains intergrown with magnetite or interstitial with zircon in matrix and biotite-flooded areas. The overall average grain size of elongate tantocolumbite is 20 by 2 $\mu$m with a range of less than 10 to 150 $\mu$m long by 1 to 10 $\mu$m wide. Crystal aggregates are commonly 50 $\mu$m across, with a maximum range of 100 to 150 $\mu$m across.

Patterns of element depletion and enrichment throughout the differentiated suite are consistent with the hypothesis that the observed alteration and mineralization are the end-products of magmatic differentiation (Davidson, 1982).

The beryllium at Thor Lake is contained in the mineral phenacite, $Be_2SiO_4$, a colourless or white glassy mineral that is similar to and often confused with quartz. It normally contains 40-45% BeO by weight. Phenacite (also spelled phenakite), was first reported in altered Thor Lake Syenite by Davidson in 1978 (p. 126). Preliminary tests indicate that the grain size of the phenacite is amenable to its recovery by an established floatation technique (Trueman, 1984).

Although the beryllium zones are still not fully explored, the Thor Lake deposits appear to be the most significant beryllium deposits in Canada.

Beryllium is a rare-metal noted for its light weight (lighter than aluminum), high electrical resistivity, high thermal conductivity and heat capacity, high melting point, high strength to weight ratio, and high stiffness. By itself and in alloy form, beryllium finds wide use in electronic and aero-space applications. It is used in computers and peripherals, telephone and telecommunications, fibre-optics, aircraft struts and brakes, satellite frames, radar, and inertial navigation systems. Other applications include use in oil drilling and geophysical equipment, automatic transmissions, X-ray and CAT-scan equipment, nuclear moderators, and VHSIC computer chips.

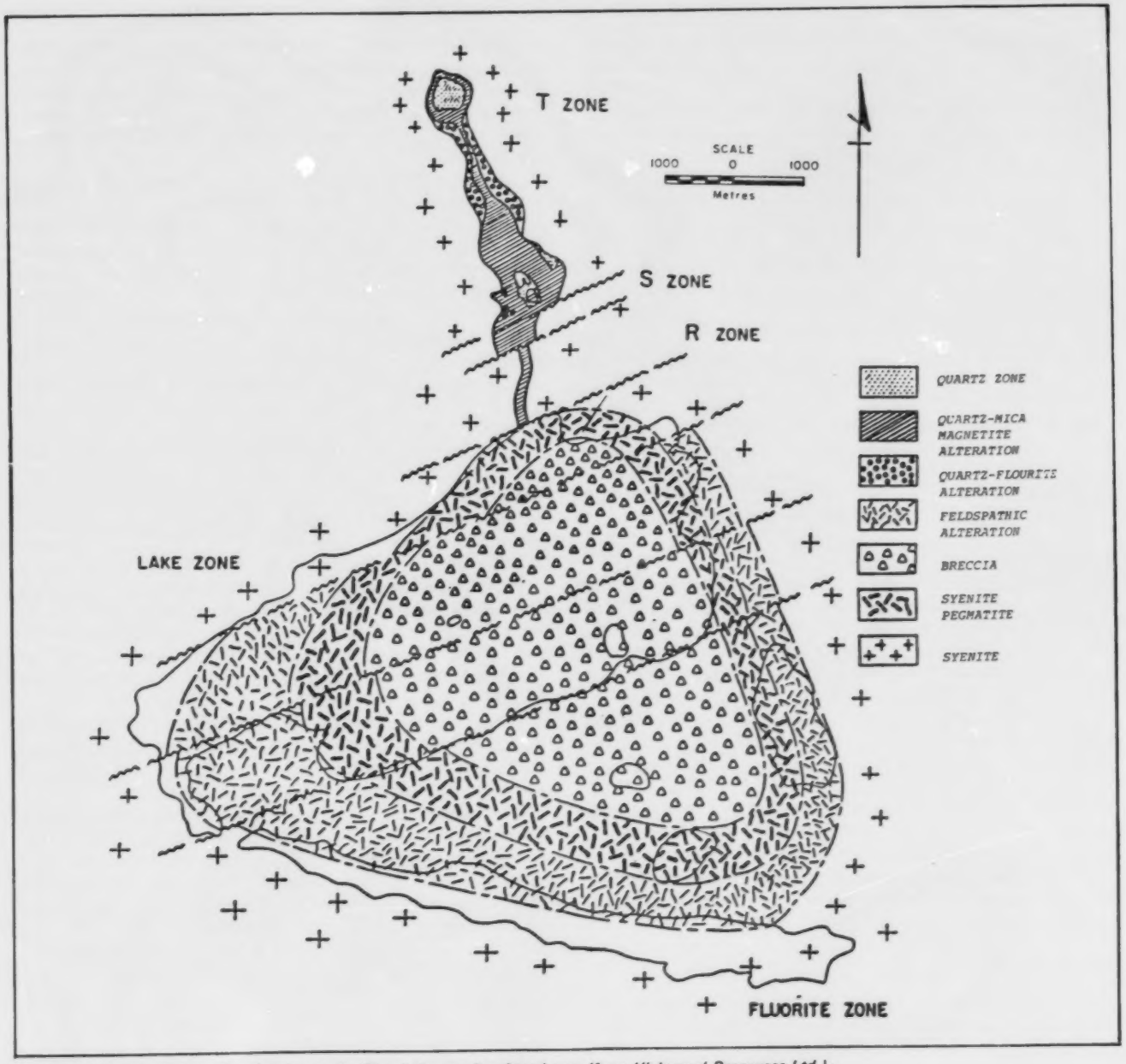



*FIGURE 6-10: Distribution of rock types in the Thor Lake syenite altered core (from Highwood Resources Ltd.)*

## CURRENT WORK AND RESULTS

**1984:**

By the spring of 1984, over 100 drill holes in the T Zone had outlined two beryllium deposits, one of 434,550 t grading 1.4% BeO and another of 1,180,000 t of 0.66% BeO (Highwood Resources Ltd., Annual Report, 1984).

During the summer of 1984, geological mapping was completed on the T Zone and extended to cover the R, S, Lake and Fluorite Zones. This work was accompanied by removal of overburden, drilling and blasting to obtain surface samples for assay control and the delineation of the mineralized areas. Simultaneously, a sample was taken out of the high-grade beryllium zone at the north end of the T Zone, lifted by helicopter to a barge on Great Slave Lake, transported to Yellowknife and thence by truck to Witteck Development Inc. in Ontario. Other metallurgical work at the Alberta Research Council demonstrated the practicability of recovering fine-grained tantalum-niobium minerals.

In addition, selected samples were taken from the beryllium-zone drill cores for mineralogical studies of the yttrium and rare-earth minerals. A program of re-assaying these sections has established a significant reserve of these metals, both within and adjacent to the beryllium deposits.

These same sections in the T Zone were assayed for gadolinium, neodymium, and samarium as well as niobium and gallium. From this work, values have averaged 0.21% yttrium, over 1.0% niobium, 0.1% neodymium, 0.06% gadolinium, 0.12% samarium, 0.05% gallium and 0.9% cerium and lanthanum. Individual assays of core have run as high as 1.28% yttrium oxide and 4.75% niobium oxide over 3 m (10 feet) indicating a profound enrichment of these metals in the beryllium zones.

The Lake Zone was also drill tested in 1984. Although this work was not successful in isolating higher grade tantalum areas, it contributed to a revised estimate of tantalum resources in the Lake Zone to an inferred 181.5 Mt (Highwood Resources Ltd., Annual Report 1984).

Mineralogical studies of the deposits were begun at the University of Alberta and CANMET. About 120 km of ice road was built on Great Slave Lake between Yellowknife and Thor Lake, and some 500 t of mining equipment and supplies were moved to Thor Lake in preparation for the 1985 underground program.

Thirty-five holes (2,501.2 m) were drilled between January and March, 1984 and 21 holes (2,280.4 m) between September, 1984 and February, 1985. Most of these holes, now more than 100, were drilled in the T-Zone, but a few were in the Lake Zone.

**1985:**

Highlight of the 1985 work at Thor Lake was the underground program contracted to Strathcona Mineral Services Ltd. of Toronto. A 500 m long decline was driven to more than 80 m depth in the Be-Y-REE-rich north T Zone, primarily to provide a bulk sample of the various sub-zones for metallurgical testing, but also to verify and compare assay and berylometer results with drill results. A 90 t bulk sample of material mined in the beryllium zones was shipped to Lakefield Research Ltd. of Lakefield, Ontario by year end.

A total of 22 additional holes (1,822.5 m) were drilled in the deposits between September and early December of 1985.

Mineralogical studies were undertaken in the Geology Department, University of Alberta (Smith and de St. Jorre, 1985; Smith, 1985 and de St. Jorre, 1986). Specifically, the studies are concerned with the identification and nature of the various Y-, REE-, Nb- and Ga-bearing minerals present and their distribution within the beryllium deposits of the T-Zone and their sub-units (Figure 6-11). Of particular interest are the sizes, textural relationships and gangue mineral associations of these potentially economic minerals. Standard petrographic techniques and electron microprobe analysis are being done in conjunction with assay data used in this work.

By December, 1984, three Y-bearing minerals had been identified. Gadolinite $Y_2FeBe_2(SiO_4)_2O_2$, and xenotime $YPO_4$, appear to be the most abundant species. The third Y-bearing mineral is an unidentified Th, Fe, Y-silicate that is radioactive and may possibly be a new mineral species. Volatilization effects under the electron beam during microprobe analysis suggest that this mineral may be metamict and/or hydrous. All three Y-bearing minerals are found predominantly in the Lower Intermediate - Upper Intermediate Zones, although xenotime also occurs as inclusions in quartz in the Quartz zone.

The most abundant REE-bearing minerals are three LREE-enriched fluorocarbonates, tentatively identified as bastnaesite $Ce(CO_3)F$ and two of the three Ca-bearing phases: synchisite, parisite and roentgenite. These fluorocarbonates are found throughout the deposit in all four lithologic units. Monazite $(Ce,La,Y,Th)PO_4$, another LREE-enriched phase, is found in all rock types, excluding the Quartz zone. High La, Ce and Nd assays are attributed to the presence of one or more of these LREE-bearing minerals. High Gd assays are attributed to gadolinite and xenotime.

Concentrations of Nb minerals occur predominantly in the Wall zone and to a lesser extent in the Lower Intermediate zone. The principal Nb-bearing mineral in the T zone deposits is a Nb oxide, probably columbite $(Fe,Mn)Nb_2O_6$ or ashanite $(Nb,Fe,Mn)_4O_8$. A second Nb-bearing mineral, associated with Nb oxide in the Lower Intermediate zone, is an unidentified Nb,Ti,U-silicate. Tantalum, in these Nb-bearing phases, is present in trace amounts only.

Ga-bearing minerals are found exclusively in the albitized rocks of the Wall zone. Assay results indicate an average content of 500 ppm Ga in the Wall-zone rocks. The Ga occurs in albite laths where it is probably substituting for $Al^{3+}$.

Associated Be-bearing minerals are phenacite $Be_2SiO_4$, bertrandite $Be_4Si_2O_7(OH)_2$, gadinolite(as mentioned above) and a member of the helvite group $(Mn,Fe,Zn)_4Be_3Si_3O_{12}S$ (Smith and de St. Jorre, 1985).

In 1985, the ion microprobe at Cambridge, England, was used to examine the elements hydrogen, lithium, beryllium and boron in some of these samples. This instrument permits the detection of light elements that either cannot be detected by the electron probe or can only be detected with difficulty, while at the same time offering a spatial resolution during analysis which approaches that of the electron probe. This work showed two varieties of zircon, which are intimately intergrown in a zonal manner. The lighter, less metamict zones have higher F, much higher Li, lower H and Be and much lower B than the darker grey more metamict zones. The metamict zones contain several percent U and Y.

Exploratory cathodoluminescence miscroscopy was also carried out at Cambridge. This shows considerable potential for revealing the modal amounts of cathodoluminescent minerals that are present, as well as for highlighting certain textural features (Smith, 1985).

In 1985, additional samples for mineralogical study were collected from the underground development in the T Zone. In addition, samples were collected from drill core of the Lake Zone, which was relogged during 1985.

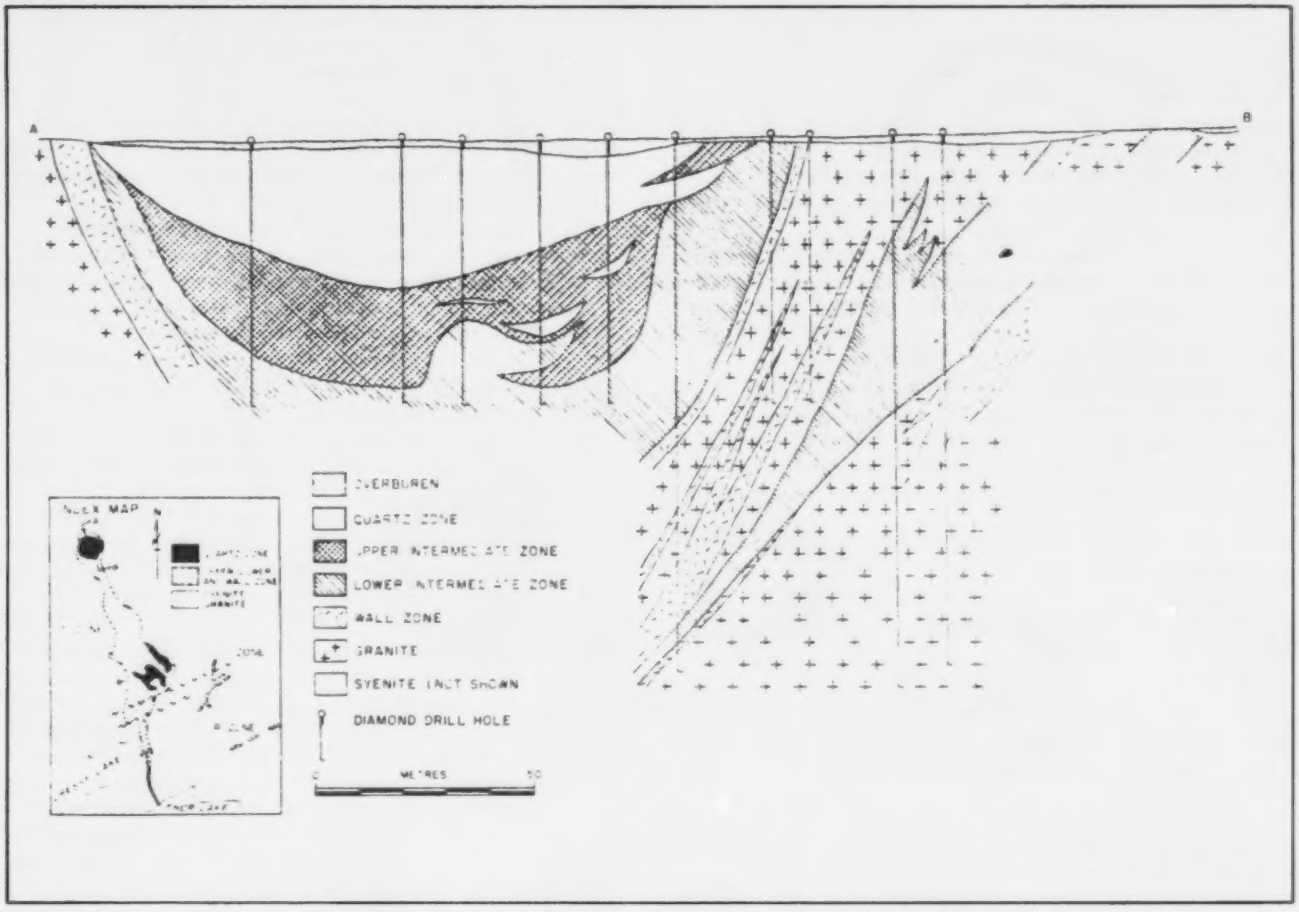



*FIGURE 6-11: Longitudinal section (30+00E) showing the geology of the T-Zone beryllium deposit (from Trueman and others, 1984).*

## BF, TJO AND BEEF CLAIMS

The Big Fish Syndicate
3960 W 33 Ave.
Vancouver, B.C., V6N 2H8

REE, Nb, Y
85 I/1,2
62°N,112°30'W

### REFERENCES

Davidson (1978, 1982).
DIAND assessment report: 082038.

### PROPERTY

BF 1-2, TJO, BEEF

### LOCATION

The claims are adjacent to the southeastern corner of Highwood Resources Ltd.'s NB claims and include a discontinuous thin strip of the north shore of Hearne Channel, 1 to 8 km west of McKinley Point. Over 90% of the claim area is under the waters of Hearne Channel.

Hook Bay and Hook Point, both informal names are 2 km west of McKinley Point.

### HISTORY

The BF 1 claim was recorded in September, 1981; BF 2 was recorded in October, 1983 and the TJO and BEEF claims in May, 1984.

In September, 1983, a reconnaissance rock geochemistry survey indicated potentially economic Ta and Nb results from peralkaline dykes at Hook Point on the BF 2 claim. Magnetometer and scintillometer surveys were undertaken at the same time, but significantly elevated readings were not encountered.

### DESCRIPTION

The BF 1 claim includes the southernmost boundary of Thor Lake Syenite and the enclosing Grace Lake Granite (Fig. 6-9). It also contains the intersection of this contact with the north shore of the Hearne Channel and the southeasterly projection of a structural lineament that passes through Highwood Resources Ltd.'s T Zone and Fluorite Zone (Davidson, 1978, 1982). This southeast-trending lineament is clearly evident on the aeromagnetic maps (Geol. Surv. Can., Map 7190 G). Speculation suggests that this intersec-

tion may be the loci for the deposition of tantalum, tin and rare earth minerals similar to those found at Thor Lake or Mountain Pass, California. This concept is supported by black manganese staining similar to the T Zone on Highwood Resources Ltd. claims.

The BF 2 claim adjoins BF 1 to the west and contains three northeast-trending pegmatitic peralkaline dykes on the southeastern part of Hook Point.

### CURRENT WORK AND RESULTS

In the fall of 1984, a four-person crew blasted and sampled three peralkaline dykes in the vicinity of Hook Point. Some 8.5 $m^3$ (300 $ft^3$) of trenching was done and about 45 kg (100 lb) of material was taken as samples. Rare earth elements, Nb, Zr and Y are all higher than background and concentratable to the 50,000 to 2,500,000 ppm (0.1 to 5 lb/ton) range. However, these results are not as high as a 1983 sample and below those necessary for economic exploration. Beryllium was not enriched in any of the samples. Several biogeochemical samples of various types of vegetation, collected at the mouth of several small drainage areas, did not reveal any anomalous enrichment of Be, Ta, Nb or REE.

## THE GREAT SLAVE PLAIN

The Great Slave Plain is that part of the Interior Plains between latitudes 60°N and 64°N and between the Franklin Mountains and the western edge of the Precambrian Shield in the vicinity of Great Slave Lake. It is underlain mainly by Paleozoic carbonates, evaporites and shales. It has a relatively flat topographic surface, generally less than 300 m in elevation, that is characterized by sparse outcrop, abundant swamp, sink holes and karst topography. The Horn Plateau, which consists of Mesozoic strata, is a broad, smooth upland rising to 835 m in elevation.

The Great Slave Plain includes the Pine Point Lead-Zinc District (Fig. 6-12), the source of a large proportion of the Northwest Territories' annual production of minerals. Because of extensive over-burden, the flat-lying attitude of the host rocks and the nature of Pine Point type Pb-Zn deposits, exploration is mainly by IP surveys (Lajoie and Klein, 1979) and fence or grid drilling. Attempts to find deposits using rock and soil geochemistry, gravity and EM surveys have not been as cost effective. Most exploration work is done in the winter months when the widespread swamps and muskegs are frozen.

The geology and exploration philosophy has been discussed by several workers: Campbell, (1967), Skall (1975), Alldrick and others (1981), Rhodes and others (1984), Spencer and others (1980), Carter (1983), Krebs and Macqueen (1984), and Webb and Macqueen (1985). The geology of the area has been mapped and discussed by Douglas and Norris (1974) and Norris (1965).

Activities in the Pine Point Lead-Zinc District were severely affected by the 1982 economic recession and accompanying low metal prices. Pine Point Mines Ltd., the only producer in the region (see Chapter 2), shut down operations from January 2 to June 15, 1983. Mine production came from five operating and two developing pits in 1983 compared with eleven pits in 1982. About 900,000 t of ore was milled in the six and a half month operating period in 1983, compared to about 2,200,000 t for all of 1982.

Tabular ore zones were mined for the first time in 1981 and most of the 1982-83 production came from deposits of the North Trend (Alldrick and others, 1981; Rhodes and others, 1984).

Late in 1981, a large prismatic-type ore body (N-81) containing 0.9 Mt of high grade Pb-Zn, was discovered about

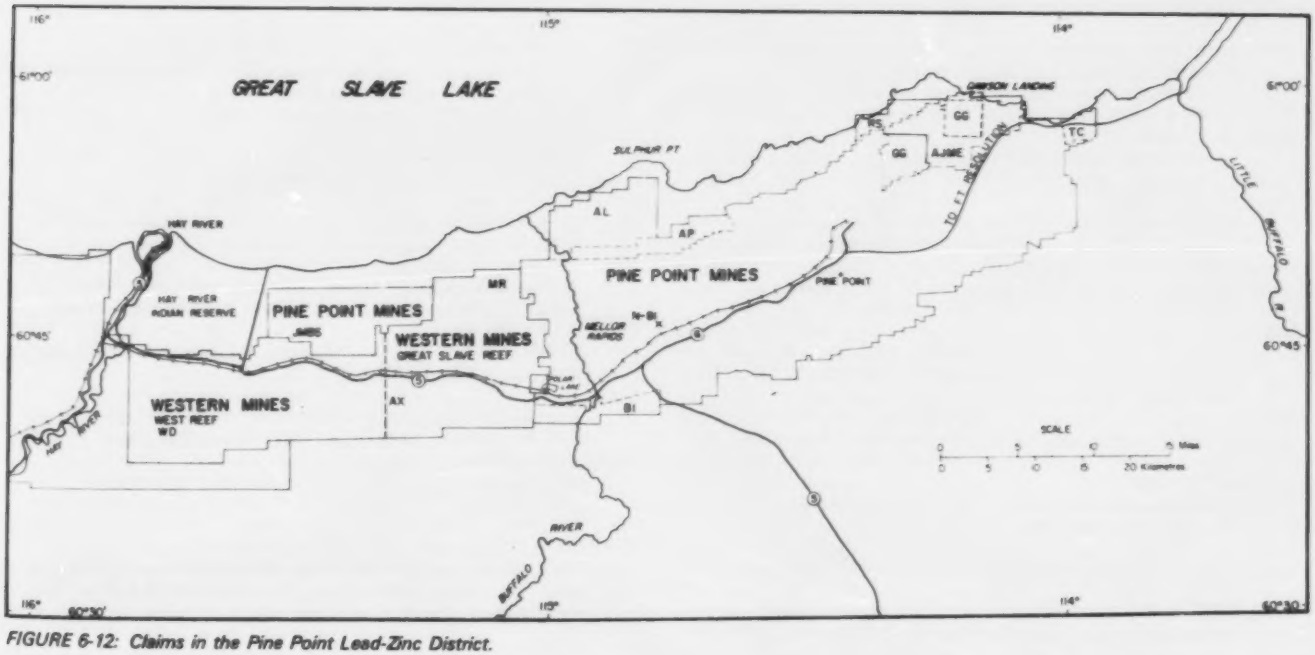



*FIGURE 6-12: Claims in the Pine Point Lead-Zinc District.*

20 km west-southwest of the concentrator along the Main Trend (Fig. 6-12). The 1982 exploration program confirmed the existence of 1.8 Mt of additional ore. The N-81 deposit contains a total of 2.7 Mt of ore grading 7% Pb and 14% Zn and is expected to become the most important production area over the next five years (Carter, 1984).

**1984:**

Exploration statistics are given in Table 6-4 for the years 1984 and 1985. However, most of this work is on mineral leases and the results are rarely reported as assessment work or to the public. When assessment work is required, it is not submitted in the form of comprehensive geological reports.

During 1984 and 1985, a few holes drilled on the north trend JMBS, AL, GG and AB claims (Fig. 6-12) and southern main trend BI claims were reported as assessment work. An IP survey was done on the RS claims in July, 1985.

Much of the 1984 exploration was along the Main Trend west of the N-81 deposit. One prismatic orebody was discovered 10.5 km west of the concentrator. It contains an estimated 200,000 t grading 8.1% Zn and 3.9% Pb. Closer spaced drilling in and around known orebodies on the North Trend resulted in a small increase in ore tonnage with some loss in zinc metal, (Pine Point Mines Ltd. annual report 1984).

**1985:**

Exploration expenditures in 1985 were $4.3 million. The combined geophysics and drilling programs were successful in adding nearly 2 Mt of ore grading 9.1% Zn and 4.6% Pb. The bulk of this ore was located in two tabular deposits on the North Trend, Z-60 and X-49; an underground deposit, X-71, also on the North Trend; and a prismatic deposit, P-24, on the East Main Trend. P- 24, scheduled for development in 1986, is a shallow, 500,000-ton deposit grading 7.6% Zn and 3.7% Pb.

***TABLE 6-4 SUMMARY OF EXPLORATION ON PINE POINT LTD.'S MINERAL HOLDINGS***

| | 1984 | 1985 |
|---|---|---|
| Expenditure (millions of dollars) | 3.7 | 4.3 |
| Geophysics - IP (line-km) | 350 | 740 |
| Exploration drilling (m) | 49,072 | 45,720 |
| Ore outline drilling (m) | 48,158 | 48,768 |

At the end of 1985, ore reserves calculated using long-term forecast prices were 15.8 million tons grading an average 6.7% Zn and 2.7% Pb, compared with 24.0 Mt grading an average of 6.7% Zn and 2.7% Pb at the end of 1984. Rising mining costs and forecasts of lower metal prices made it necessary to reassess the deposits included in the Company's ore reserves. A review included technical and long-term economic appraisals and resulted in the removal of 7.8 million tons of open pit material grading an average 4.7% Zn and 3.2% Pb from ore reserves (Pine Point Ltd. Annual Report 1985).

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# CHAPTER 7
# BEAR STRUCTURAL PROVINCE

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## INTRODUCTION

The geology of the Bear Structural Province (Fig. 7-1) has been summarized in several previous Mineral Industry Reports (Seaton, 1978, 1981, 1983a, 1984; Seaton and Hurdle, 1978). In this report no attempt is made to summarize the geology beyond a statement of the geological subdivisions under which the properties have been grouped. Several Geological Survey of Canada and university thesis projects are in progress or have recently been completed covering parts of the Bear Province and it is anticipated that soon a drastically revised geological summary may be required.

The East Arm Subprovince, though geologically included with the Bear Province, is covered in Chapter 6 of this Mineral Industry Report.

References relating to individual property descriptions are listed separately in the appropriate sections. General information on the Bear Structural Province and detailed reports on mapping of specific areas of the Bear Province include those by: Allan and Cameron (1973); Badham (1972, 1976, 1978); Baragar and Donaldson, (1973); Campbell (1978, 1979); Campbell and Cecile (1975, 1976a,b,c, 1979); Cecile and Campbell (1977); Easton (1980); Fraser (1964, 1974); Fraser and others (1972); Gibb (1978); Grasty and Richardson (1972); Grotzinger (1982); Henderson, J.F. (1949); Hildebrand (1981, 1982); Hildebrand and others (1984); Hildebrand and Roots (1985); Hoffman (1973, 1977, 1978, 1980a,b); Hoffman and Bell (1975); Hoffman and Cecile (1974); Hoffman and Henderson (1972); Hoffman and McGlynn (1977); Hoffman and others (1970, 1977, 1978, 1980, 1984); Hoffman and Pelletier (1982); Kerans and others (1981); Kidd (1936); Kindle (1972); Lord (1941, 1942, 1951); Lord and Parsons (1952); Miller (1982); McGlynn (1957, 1974, 1975, 1976, 1977, 1980); McGlynn and Ross (1963); McGrath and Hildebrand (1984); Mursky (1963, 1973); Padgham and others (1974); Reichenbach (1985); Shegelski and Murphy (1972); Shegelski and Thorpe (1972); Smith (1962, 1967); St-Onge and Hoffman (1980); St-Onge and others (1984); Thompson and Ashton (1984); Thorpe (1970); Tirrul (1985); Tremblay (1971); Wilson and Lord (1942).

The three properties in the Bear Structural Province, explored in 1984-85 are underlain by rocks of the McTavish Supergroup which form part of the Wopmay Orogen, the subdivisions of which are listed below.

## WOPMAY OROGEN

The Wopmay Orogen (Hoffman, 1981) comprises Aphebian sediments, volcanics and plutons to the east of Great Bear Lake. From east to west, the Wopmay Orogen includes the following (Fig. 7-1):

a) Epworth Group sediments of the autochthonous zone.

b) Epworth Group sediments and volcanics of the Asiak Fold and Thrust Belt.

c) Epworth and Akaitcho Group metasediments and metavolcanics of the Hepburn Metamorphic-Plutonic Belt.

d) The Great Bear Volcano-Plutonic Complex, which comprises mainly synvolcanic granitoid plutons and associated, largely subaerial, volcanics of the McTavish Supergroup. Parts of the complex are underlain by sediments and intrusive quartz porphyry or quartz-feldspar porphyry.

e) The Hottah Terrane, which consists of metamorphic rocks of uncertain, though probably Aphebian, age exposed in the Hottah Lake and Leith Peninsula areas.

## DUMAS PROJECT

| | |
|---|---|
| Central Electricity Generating | Uranium |
| Board Exploration (Canada) Ltd. | 86 K/8,9 |
| Suite 700, 635-8th Ave. S.W. | 66°22'30"-66°45'N |
| Calgary, Alta., T2P 3M3 | 116°00-116°30'W |

### REFERENCES

Bowring (1982); Hildebrand (1984); Hoffman (1978, 1980, 1984); Seaton (1981, 1983a,b).

DIAND assessment reports: 080959, 081168, 081967.

### PROPERTY

Prospecting Permits 1026-1030.

### LOCATION

North Dumas Lake, in the central part of the Dumas Project area, is 460 km north-northwesterly of Yellowknife. Prospecting Permits 1026 and 1027 cover 86 K/8 NW and NE respectively, and Prospecting Permits 1028, 1029 and 1030 cover 86 K/9 NW, SW and SE respectively (Fig. 7-1). The Sloan River flows northwards through Gagne Lake and Dumas Lake on Prospecting Permit 1026, through North Dumas Lake on the boundary between Permits 1026 and 1029 and northwesterly through Prospecting Permit 1029.

### HISTORY

The eastern margin of the Prospecting Permit 1030 area was previously explored by Hudson Bay Oil and Gas Company Ltd., which staked the PER claims in May 1977 and the HUD claims, which adjoined and lay east of the PER group, in December 1977. The properties were explored for uranium (Seaton 1981, 1983a,b and DIAND assessment reports 080959, 081168). Cominco also explored for uranium in the area south and west of Perrault Lake. In 1975, Cominco recorded the SLO and BURP claims, at and near the south end of Perrault Lake, and 25 DRY claims, roughly 10 km west of Perrault Lake.

During 1983 and 1984 Central Electricity Generating Board Exploration (Canada) Ltd. (CEGBE) and Uranerz Exploration

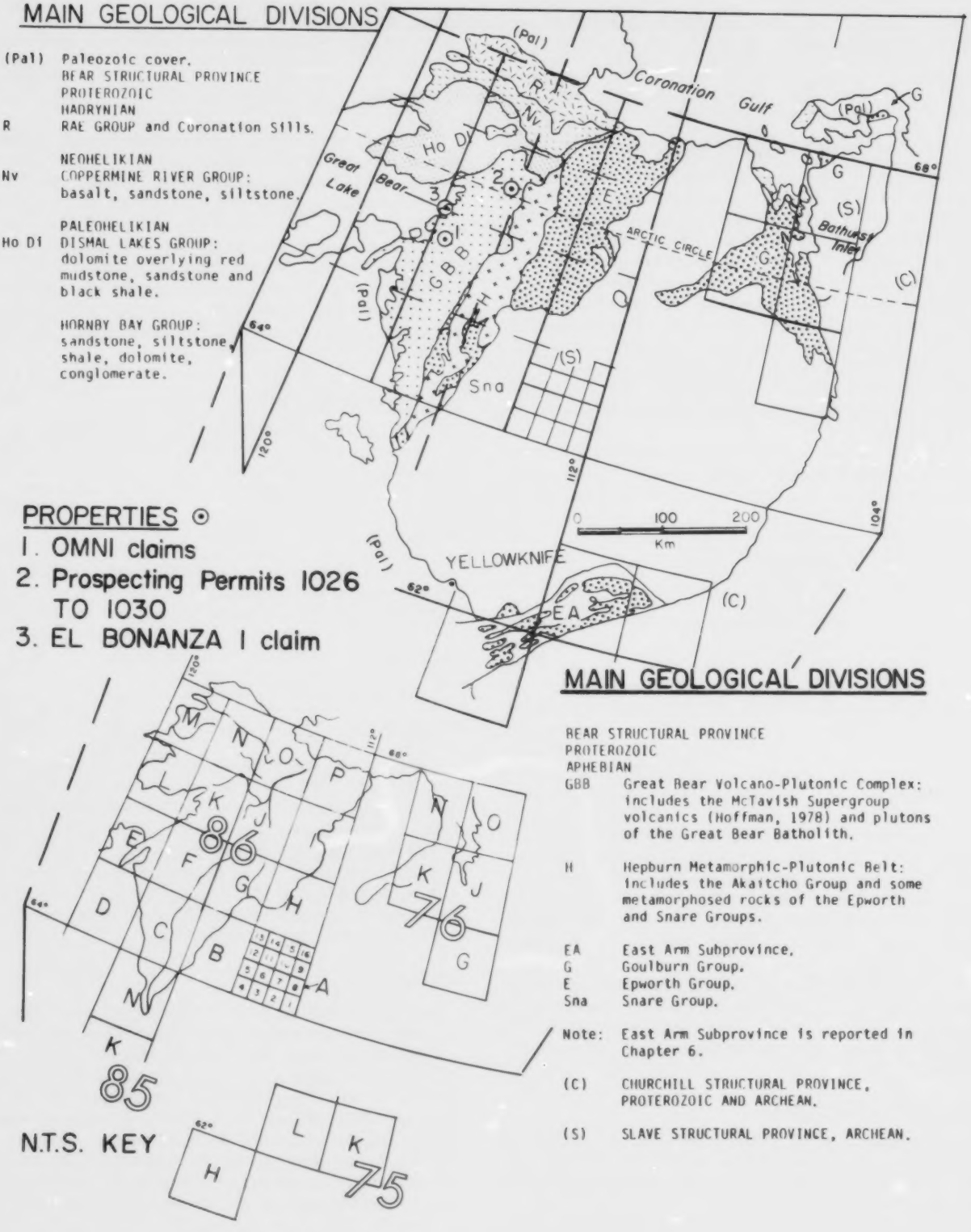

MAIN GEOLOGICAL DIVISIONS
(Pal) Paleozoic cover.
BEAR STRUCTURAL PROVINCE
PROTEROZOIC
HADRYNIAN
R RAE GROUP and Coronation Sills.
NEOHELIKIAN
Nv COPPERMINE RIVER GROUP: basalt, sandstone, siltstone.
PALEOHELIKIAN
Ho Dl DISMAL LAKES GROUP: dolomite overlying red mudstone, sandstone and black shale.
HORNBY BAY GROUP: sandstone, siltstone, shale, dolomite, conglomerate.
Coronation Gulf
Great Bear Lake
ARCTIC CIRCLE
Bathurst Inlet
YELLOWKNIFE
Sna
0 100 200
Km
PROPERTIES
1. OMNI claims
2. Prospecting Permits 1026 TO 1030
3. EL BONANZA 1 claim
N.T.S. KEY
MAIN GEOLOGICAL DIVISIONS
BEAR STRUCTURAL PROVINCE
PROTEROZOIC
APHEBIAN
GBB Great Bear Volcano-Plutonic Complex: includes the McTavish Supergroup volcanics (Hoffman, 1978) and plutons of the Great Bear Batholith.
H Hepburn Metamorphic-Plutonic Belt: includes the Akaitcho Group and some metamorphosed rocks of the Epworth and Snare Groups.
EA East Arm Subprovince.
G Goulburn Group.
E Epworth Group.
Sna Snare Group.
Note: East Arm Subprovince is reported in Chapter 6.
(C) CHURCHILL STRUCTURAL PROVINCE, PROTEROZOIC AND ARCHEAN.
(S) SLAVE STRUCTURAL PROVINCE, ARCHEAN.

*FIGURE 7-1: Geological divisions of the Bear Structural Province.*

and Mining Ltd. (UEM) discovered radioactive showings during a regional reconnaissance program. UEM managed the project in 1983 and CEGBE was operator in 1984 and 1985. Prospecting Permits 1026-1030 were granted to CEGBE on February 1, 1985. Prospecting Permit 1028 was relinquished on February 1, 1986. The prospecting permits were explored in 1985 in joint venture with UEM.

LEGEND

QUATERNARY

Glacial and other surficial deposits

PROTEROZOIC

HELIKIAN

HORNBY BAY GROUP

Quartz arenite, conglomerate and red beds of Big Bear Fluvial System

APHEBIAN

GREAT BEAR BATHOLITH

Medium-grained hornblende diorite and tonalite stocks (G4)*

Granite, adamellite, granodiorite units G2* and G3*. Includes from north to south: granites of the Spence Pluton, adamellites and granodiorites of the Kamut Pluton, granodiorites of the Junius Pluton, adamellites of the Adam Pluton

INTRUSIVE PORPHYRY

Gagne porphyry: megacrystic alkali-feldspar-quartz-plagioclase-oxybiotite porphyry forming laccoliths intrusive into mudstone of the Dumas Group (PG)*

McTAVISH VOLCANICS

DUMAS GROUP

Ignimbrites (Dri)*. Crystal-rich rhyolite-quartz latite

Basalt flows, in part strongly porphyritic (Db)*

Sediments, undivided:
Lacustrine mudstone-turbidite (Dm)*
Alluvial volcanic-lithic arenite (Ds)*
Alluvial volcanic-pebble conglomerate locally contains pebbles derived from east of Wopmay Line (Dc)*

*Units from Hoffman (1978)

WOPMAY LINE

The line is the trace of a surface separating McTavish Volcanics from Akaitcho Group metasedimentary and metavolcanic gneisses and granitic orthogneisses.

AKAITCHO GROUP

Metasedimentary, metavolcanic and granitic orthogneisses

## DESCRIPTION

Most of the project area is underlain by volcanics and sediments of the Dumas Group of the McTavish Supergroup (Bowring, 1982; Hoffman, 1978, 1980, 1984). The eastern margin of the area is underlain by Archean granitoids and early Proterozoic granites of the Hepburn Intrusive Suite. A wedge of Helikian Hornby Bay Group sediments occupies a graben extending southward from Perrault Lake through most of Prospecting Permit 1030. The remainder of the area is underlain by granitoids of the Great Bear Intrusive Suite, which intrude the MacTavish Supergroup rocks.

The geology of the Dumas Project area with locations of various radiometric anomalies found by CEGBE is shown in Figure 7-2.

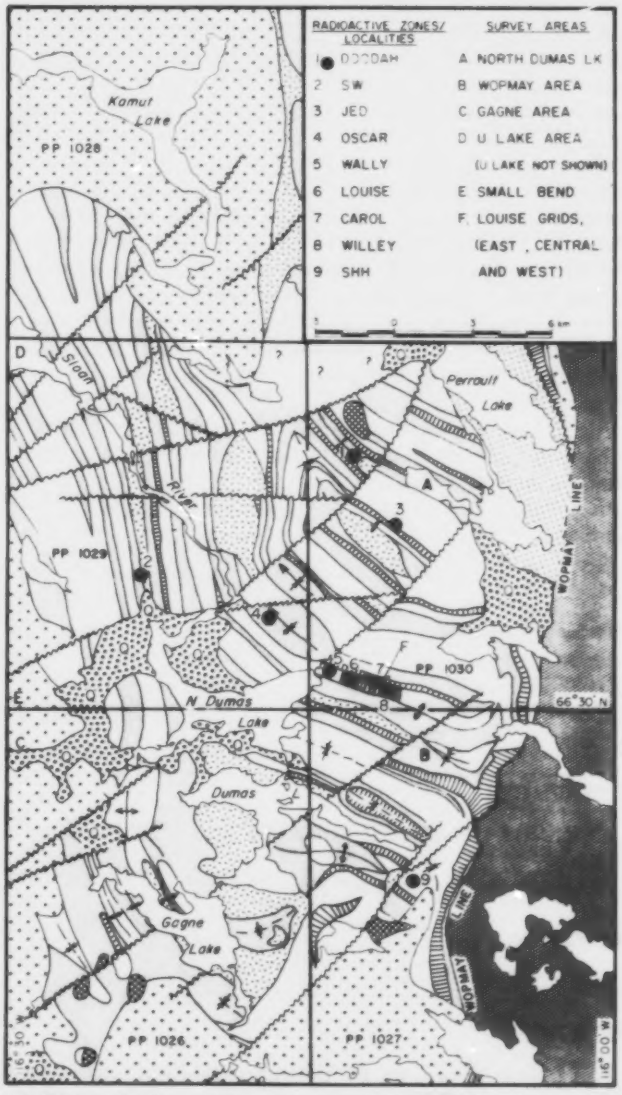



*FIGURE 7-2: Geology of Prospecting Permits 1026-1030 (geology modified from Hoffman, 1978).*

## CURRENT WORK AND RESULTS

Reconnaissance geological mapping at 1:50,000 and prospecting were conducted over 86 K/8,9. Semi-detailed geological mapping at 1:10,000 and prospecting were done in the North Dumas area, the Wopmay area, the Gagne area, the U Lake area and the Small Bend area. Detailed surveys explored the Louise area where a highly radioactive uranium-, silver-, cobalt-, nickel- and copper-bearing boulder was found in 1984 on ground now covered by the Louise West grid. The adjoining Louise West, Central and East grids were geologically mapped at 1:1000 and prospected, and the Louise West and Central grids were soil sampled. Soil samples were analyzed for uranium, copper, nickel and cobalt. Five trenches were excavated on showings in the Louise Grid area. Showings trenched were the Willey East, Willey Central and nearby W-2, in the east central part, the Willey West in the central part of the Louise Central Grid, and the Carol stratabound native copper showing on the eastern margin of the Louise West Grid.

At the Willey Central trench where strong radioactivity was noted pitchblende is confined to a narrow zone in conglomerate. Low grade copper and silver assays were obtained across 3 m of conglomerate and grit which is flanked by mudstone. Copper minerals include chalcopyrite, bornite and malachite. The W-2 trench also covers a narrow (less than 1 m thick) unit of conglomerate flanked by mudstone: the conglomerate contains less than 1% copper. The Willey West trench is apparently excavated in the same unit of conglomerate as the Willey Central trench. Sampling revealed weak concentrations of uranium, copper and silver in the conglomerate.

The source of the Louise radioactive boulder was inferred to be in a gabbroic body to its east. No other radioactive boulders were found.

Thin sections of ten rock samples were petrographically examined.

## OMNI CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101st St.
Edmonton, Alta., T5J 3S4

Gold
86 F/12
65°40'N,116°50'W

### REFERENCES

Hildebrand (1984); Hoffman and others (1976); Seaton (1983b).

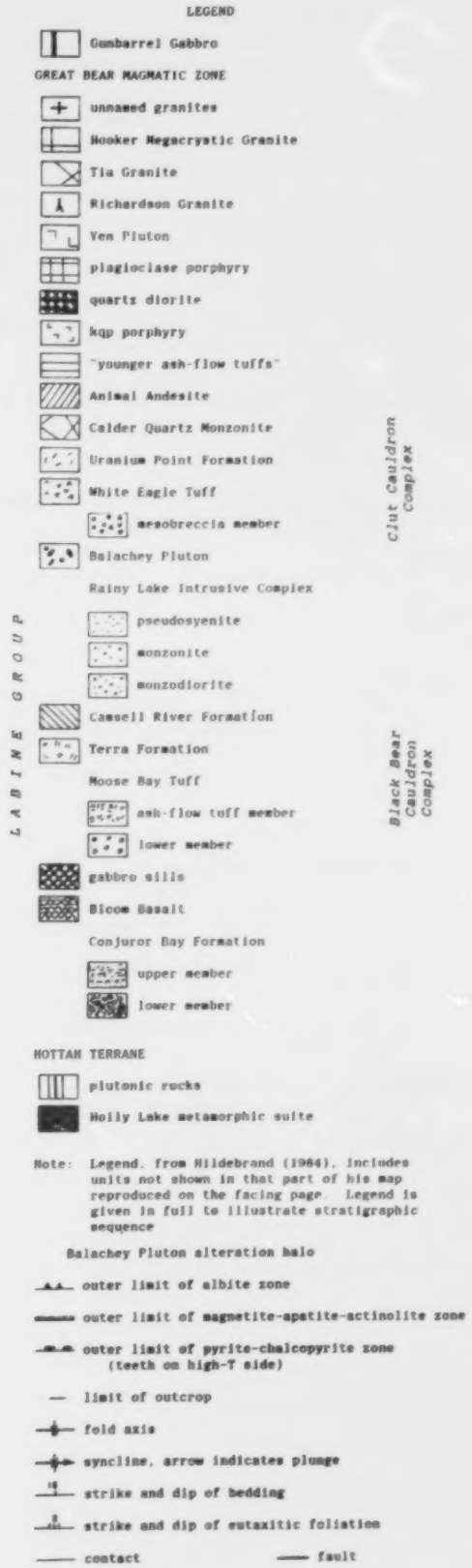
DIAND assessment report: 081825.

### PROPERTY

OMNI 1-5.

### LOCATION

The claims (Fig. 7-1) are between Balachey Lake and Ghosty Lake, and 390 km north-northwesterly of Yellowknife.



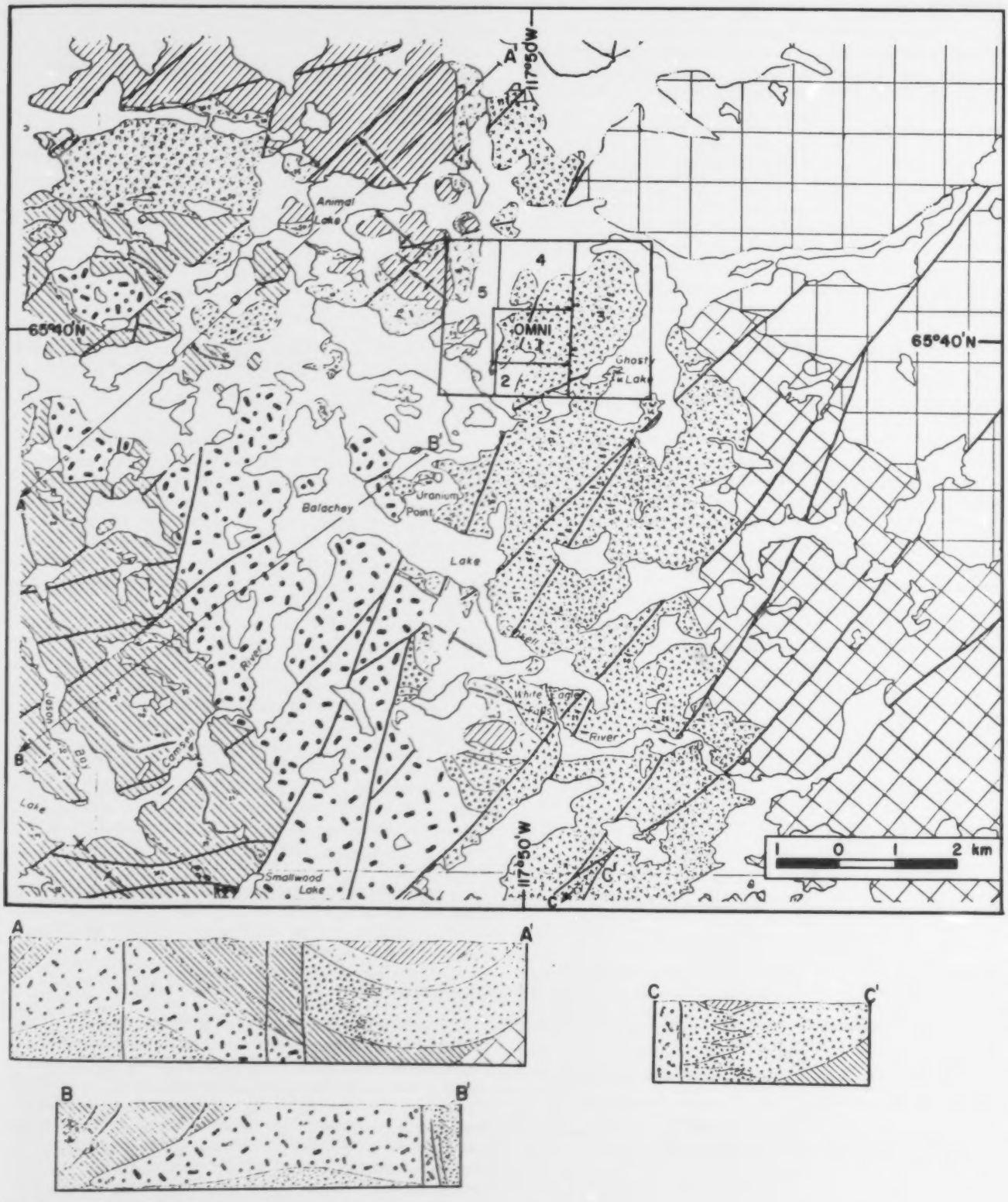



*FIGURE 7-3: Regional geology of the OMNI claims (geology from Hildebrand, 1984).*

## HISTORY

The history to 1979 has been summarized by Seaton (1983b). The claims are owned by Highwood Resources Ltd., which staked OMNI 1 in 1978 and acquired OMNI 2-5 in 1979. Echo Bay Mines Ltd. examined the property in 1984.

## DESCRIPTION

The OMNI claims are mainly underlain by the White Eagle Tuff of the Clut Cauldron Complex of the upper Labine Group (Hildebrand, 1984). The regional geology is shown in Figure 7-3. Hildebrand describes the White Eagle Tuff as 'a densely welded ash-flow sheet and associated breccias'. Smaller areas in the western part of the property are underlain by the Uranium Point Formation and Animal Andesite which outline and fill the trough of a northwesterly plunging syncline.

## CURRENT WORK AND RESULTS

In 1984, trenches in the northern part of OMNI 1 were sampled and the pre-1984 grid was extended southwards on OMNI 2 (Fig. 7-4).

A VLF-EM survey covered 7.8 line km in the southern part of the grid. Major conductors were not found.

Soil samples collected from the grid extension were analyzed for gold and for 30 elements (ICP analysis). Eleven rock samples were collected and assayed for gold and silver.

A quartz-veined and chalcopyrite-, pyrite- and hematite-bearing zone in andesitic tuffs, breccias and flows was noted to be as much as 8 m wide. Some of the samples from this zone assayed as much as 5 g/t Au and 70 g/t Ag.

The geochemical survey outlined a linear zinc anomaly spatially associated with a chalcopyrite - pyrite - hematite - bearing boulder.

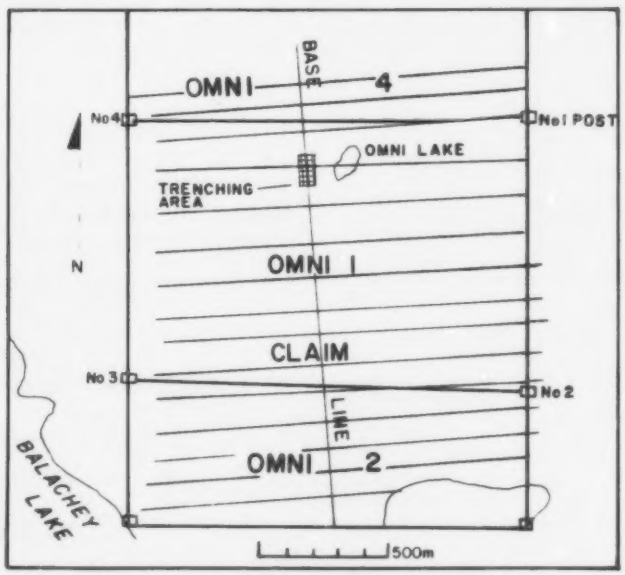



*FIGURE 7-4: Grid and trenching area on the OMNI claims.*

# EL BONANZA 1

Hugh Arden
7 Bromley Dr.
Yellowknife, NWT, X1A 2X8

Silver
86 L/1
66°01'N,118°06'W

## REFERENCES

Hildebrand (1981); Hoffman (1984); Kidd (1933); Lang (1952); McGlynn (1971); Mursky (1973); Thorpe (1972).

DIAND assessment reports: 019169, 061014, 061573 081869.

## PROPERTY

EL BONANZA 1.

## LOCATION

The property is near Mile Lake, 440 km northwesterly of Yellowknife and 8 km south of Port Radium (Fig. 7-1).

## HISTORY

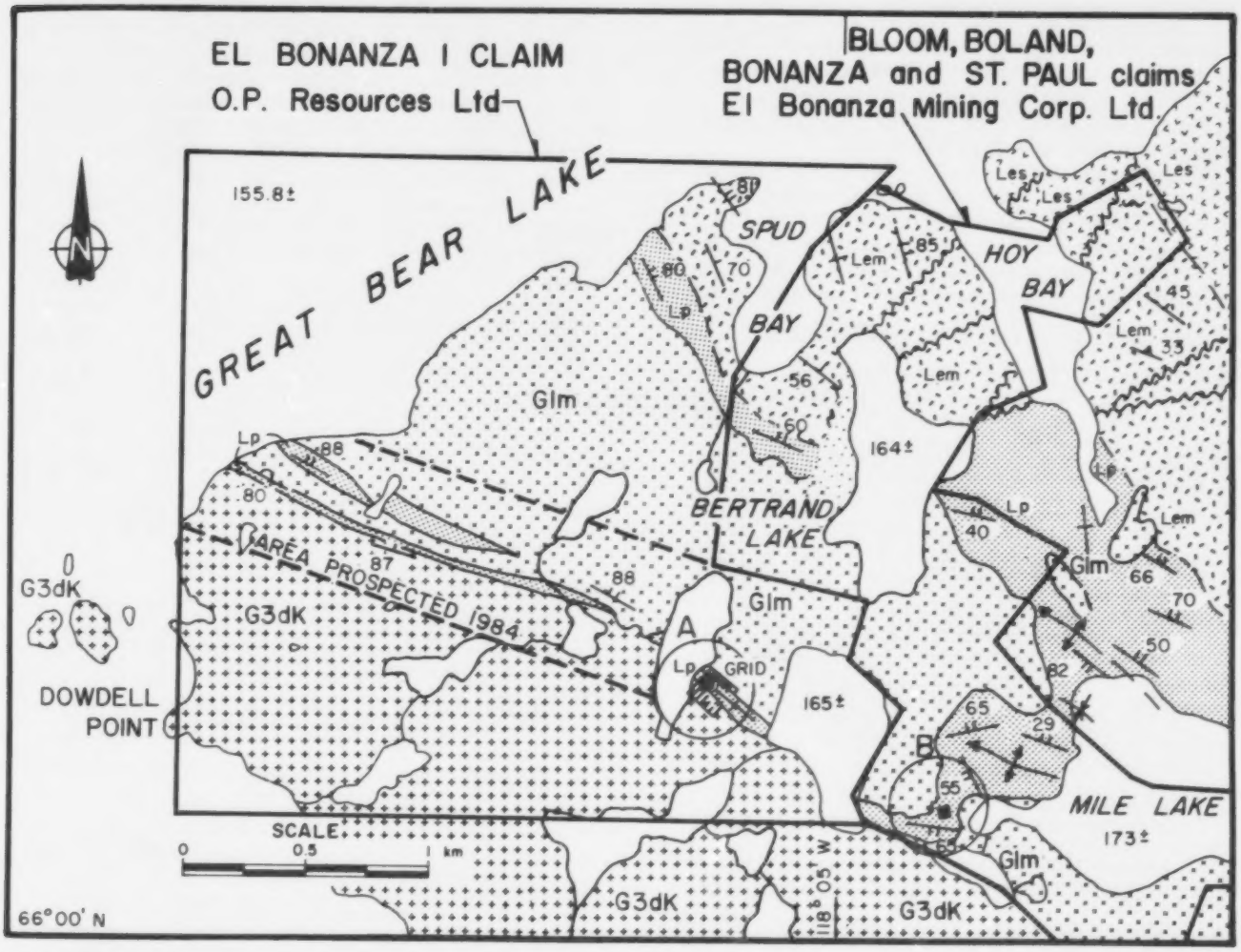
The El Bonanza silver showings were discovered in 1931 by E.C. St. Paul and were staked by G.A. Labine, and E.C. St. Paul and Associates for Eldorado Gold Mines Ltd. The original claim block covered the El Bonanza East showing and the El Bonanza West showing which now lies within EL BONANZA 1. The El Bonanza East showing is on BONANZA 7, part of a claim group held by El Bonanza Mining Corporation Ltd. who acquired an interest in the eastern part of the original claim block in 1934.

Eldorado Gold Mines Ltd. excavated 17 trenches along a 100 m long, northwesterly trending chloritic zone at the El Bonanza West showing in 1933. A shaft was sunk in the middle part of this zone, in 1938, and roughly 90 m of lateral work were completed at the 30 m (100 ft) level. No more work was done. In 1943, Eldorado Gold Mines Ltd. changed its name to Eldorado Mining and Refining Ltd., and concentrated its effort on uranium mining. Claims covering the El Bonanza West showing lapsed. EL BONANZA 1 was recorded by Hugh Arden in June 1982, who later optioned the claim to O.P. Resources Ltd, in August 1984. O.P. Resources dropped the option in September 1985 and the claim reverted back to Hugh Arden.

A more comprehensive history of the El Bonanza East and West showings can be obtained in Kidd (1933), Lang (1952), McGlynn (1971), Thorpe (1972) and in DIAND assessment reports 019169, 061014 and 061573.

## DESCRIPTION

The geology of the property is shown in Figure 7-5. EL BONANZA 1 is largely underlain by two bodies of granitoid rocks: the Mystery Island Intrusive Suite in the central, northwestern and southeastern part of the claim and the Dowdell Pluton in the southwestern part. Between the two granitoid bodies and marginal to the Mystery Island Intrusive Suite within the EL BONANZA 1 claim area is a thin unit of mainly sandstone and siltstone of the Port Radium Formation. This sedimentary unit lies within the alteration halo of the Mystery Island Intrusive Suite rocks, and hosts the El Bonanza East and the El Bonanza West silver showings (Figure 7-4).




EARLY PROTEROZOIC
GREAT BEAR BATHOLITH

**G3dk** Coarse grained biotite-hornblende (chlorite-epidote) syenogranite(k), G3d, Dowdell pluton

**Glm** MYSTERY ISLAND INTRUSIVE SUITE: medium grained diorite, quartz monozonite, quartz syenite and granodiorite; semiconcordant sheets; wide alteration haloes, comprising an inner bleached and albitized zone, a central zone of actinolite-apatite-magnetite pods, breccias, veins and replacement, an outer zone of chalcopyrite gossan; important polymetallic ore veins occur within the alteration haloes; at least one intrusion of this suite is demonstrably contemporaneous with LaBine Group volcanism

McTAVISH SUPERGROUP

**Les** SURPRISE LAKE MEMBER: porphyritic hornblende-augite-plagioclase andesite flows and breccia; many flows trachytic; some flows oxidized to a brick-red colour; includes thin sedimentary interbeds.

**Lem** MILE LAKE MEMBER: porphyritic andesite flows interbedded with volcanogenic sandstone and conglomerate, andesitic lapilli tuff and ashstone

**Lp** PORT RADIUM FORMATION: thin bedded, fine grained sandstone and siltstone with at lease two carbonate interbeds less than 1 m thick; all exposures lie within alteration haloes of the Mystery Island Intrusive Suite

**SYMBOLS**

A El Bonanza West Showing area.
B El Bonanza East Showing area.
Showings and shafts are roughly at centres of circles

Geological boundary (defined, approximate)
Bedding, tops known (inclined, overturned)
Bedding, tops unknown (inclined, vertical)
Flow banding (inclined, vertical)
Fault (defined, approximate)
Anticline, arrow indicates plunge (defined, approximate)
Syncline (approximate)

*FIGURE 7-5: Geology of El Bonanza 1 and adjoining property (geology modified after Hildebrand, 1982).*

## CURRENT WORK AND RESULTS

A grid with a 150 m northwesterly base line and 100 m winglines was constructed. The El Bonanza West showing and shaft is in the north-central part of the grid.

The grid was explored by 1:500 geological mapping, and by magnetometer and VLF-EM surveys.

Mapping revealed a zone of chloritic alteration roughly coincident with the trenched zone to the northwest, southeast of the El Bonanza West shaft. This chloritic zone includes narrower and shorter zones of carbonate veining. Sediments between the chloritic zone and the medium grained monzonite and diorite of the Mystery Island Intrusive Suite have been altered from their normal grey colour to salmon pink.

The chloritic zone coincides with a magnetic high and a VLF-EM conductor. A second VLF-EM conductor farther to the southwest and subparallel to the Dowdell Plutonic Suite granite contact crosses an overburden-covered area for much of its length and is not coincident with any magnetic high.

A 3 by 0.6 km area along the screen of Port Radium Formation Sediments was prospected. No silver showings were found. At the El Bonanza West showing dendritic silver was noted to be associated with a small amount of cobalt-nickel arsenides and generally to be concentrated in areas of more intense chloritic alteration.

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# CHAPTER EIGHT
# SLAVE STRUCTURAL PROVINCE

J.B. Seaton, Bear-Slave District Geologist
J.A. Brophy, Cordilleran District Geologist
J.C. Crux, Geologist

## INTRODUCTION

This introductory section to the Slave Structural Province is essentially the same as that in the 1977, 1978, 1979, 1980-81, and 1982-83 Mineral Industry Reports, but has some modifications in the list of subdivisions under which properties are discussed.

About two-thirds of the Slave Structural Province is made up of sediments and volcanics of the Archean Yellowknife Supergroup that have been metamorphosed under greenschist to upper amphibolite grade conditions (Frith, 1978; Neilsen, 1978; Percival, 1979; Thompson, 1978). The supracrustal rocks, of which about 15% are volcanics, are exposed in sinuous and anastamosing belts locally wrapped around basement gneisses and commonly flanked, separated or interrupted by quartz diorite, quartz monzonite, granodiorite and granite intrusions. Relatively narrow volcanic belts containing various proportions of mafic, intermediate and felsic components are commonly flanked on one, rarely on both, sides by metasediments. The metasediments are predominantly greywacke, commonly interbedded with thinner pelitic layers with phyllitic or slaty cleavage. Topographically recessive phyllite may overlie and flank the volcanics or may be found locally within the volcanic sequence.

Contact relations of granitoid plutons with surrounding supracrustal rocks are generally concordant (Henderson, 1976), although crosscutting granodiorites, quartz monzonites and associated pegmatites have been mapped. Locally the plutons are bordered by migmatite. Contact metamorphic aureoles may be extensive or practically absent.

Economic mineral discoveries have been mainly in the volcanics, and consequently these rocks have been more intensely studied. Most of the volcanic belts have been covered - in many cases more than once - by airborne magnetic and EM surveys which have outlined numerous conductors mostly related to graphitic volcanogenic sediments or extensive zones of disseminated sulphides.

The extent of pre-Yellowknife Supergroup basement is still speculative and will remain so until more geochronological studies and detailed mapping have been done. Locally, plutonic gneisses and massive rocks of tonalitic composition unconformably underlie supracrustal rocks of the Yellowknife Supergroup, as at Point Lake (Baragar and McGlynn, 1976; Henderson, 1977; Henderson and Easton, 1977). Commonly the basal contact of the Yellowknife Supergroup has been obliterated by granitic intrusions. Broad zones of granitic gneiss, migmatite and mixed gneisses, including or derived from Yellowknife Supergroup rocks (unit An of McGlynn, 1977), may include basement that is so far unrecognized. Some tonalitic clasts in the Yellowknife Supergroup sediments may be derived from unroofed syntectonic plutons.

Volcanic belts may comprise more than one cycle of volcanism, as do the Back River Volcanic Complex and the Courageous Lake-McKay Lake Volcanic Belt. Distally, the volcanics, in most cases, interfinger with the sediments that fill the greater part of the basins. Iron formations within the sediments may be distal products of volcanism. The sediments clearly show complex folding, whereas in the more competent volcanics the effect of such folding is obscure.

Selected references relating to specific parts of the Slave Province or to individual properties are listed in the appropriate sub-sections. Some general references on the Slave Province and some which, by their nature, do not lend themselves to inclusion in property sub-sections (for example; regional, structural, geochemical or airborne radiometric surveys by the Geological Survey of Canada) include: Allan and Cameron (1973); Allan, Cameron and Durham (1973a,b,c); Baragar and McGlynn (1976); Cameron (1980); Darnley (1973); Darnley and Grasty (1972); Frith (1980a,b, 1981a,b); Frith and Roscoe (1980); Fyson (1980, 1981, 1982); Fyson and Frith (1979); Henderson (1972, 1975a,b, 1976, 1978, 1981); Henderson and Macfie (1985, 1986); Henderson and Thompson (1980); James (1985, 1986); King (1982); Lambert (1977); Meintzer and others (1984); Lord (1941, 1942); McGlynn (1977); McGlynn and Henderson (1970, 1972); Richardson and others (1973, 1974); Ross (1966); Stockwell (1933); Thompson (1978); and Thompson and others (1985, 1986).

In this chapter, properties are grouped under 11 headings, indicative of common geological - in a few cases, geographical - settings (Fig.8-1). These headings are:

1. Courageous Lake-MacKay Lake Volcanic Belt;
2. Indian Mountain Lake-Benjamin Lake Supracrustal Belt;
3. Healey Lake-Regan Lake Supracrustal Belts;
4. Beechey Lake Basin;
5. Bathurst Inlet, Southeast (Western River-Gordon Bay area);
6. Wilberforce Basin
7. High Lake and Anialik Supracrustal Belt;
8. Eokuk Inlier;
9. Point Lake-Itchen Lake-Contwoyto Lake Metasedimentary Belt and Lupin Mine Area;
10. Russell Lake-Indin Lake Supracrustal Belt;
11. Yellowknife Supracrustal Basin.

The distinction between volcanic belts and supracrustal belts is arbitrary, in that most volcanic belts include variable amounts of metasediments. Moreover, volcanic belts are separated from one another by granitoid intrusions, by basement or possible basement to the Yellowknife Supergroup, and by metasediments. Hence volcano-sedimentary belts (supracrustal belts) are themselves joined by sediments making precise delineation of individual supracrustal belts rarely possible. The term 'supracrustal belt' is used in this report to describe a volcanic belt containing numerous sedimentary units that by volume are an important component of the belt. For convenience some properties underlain

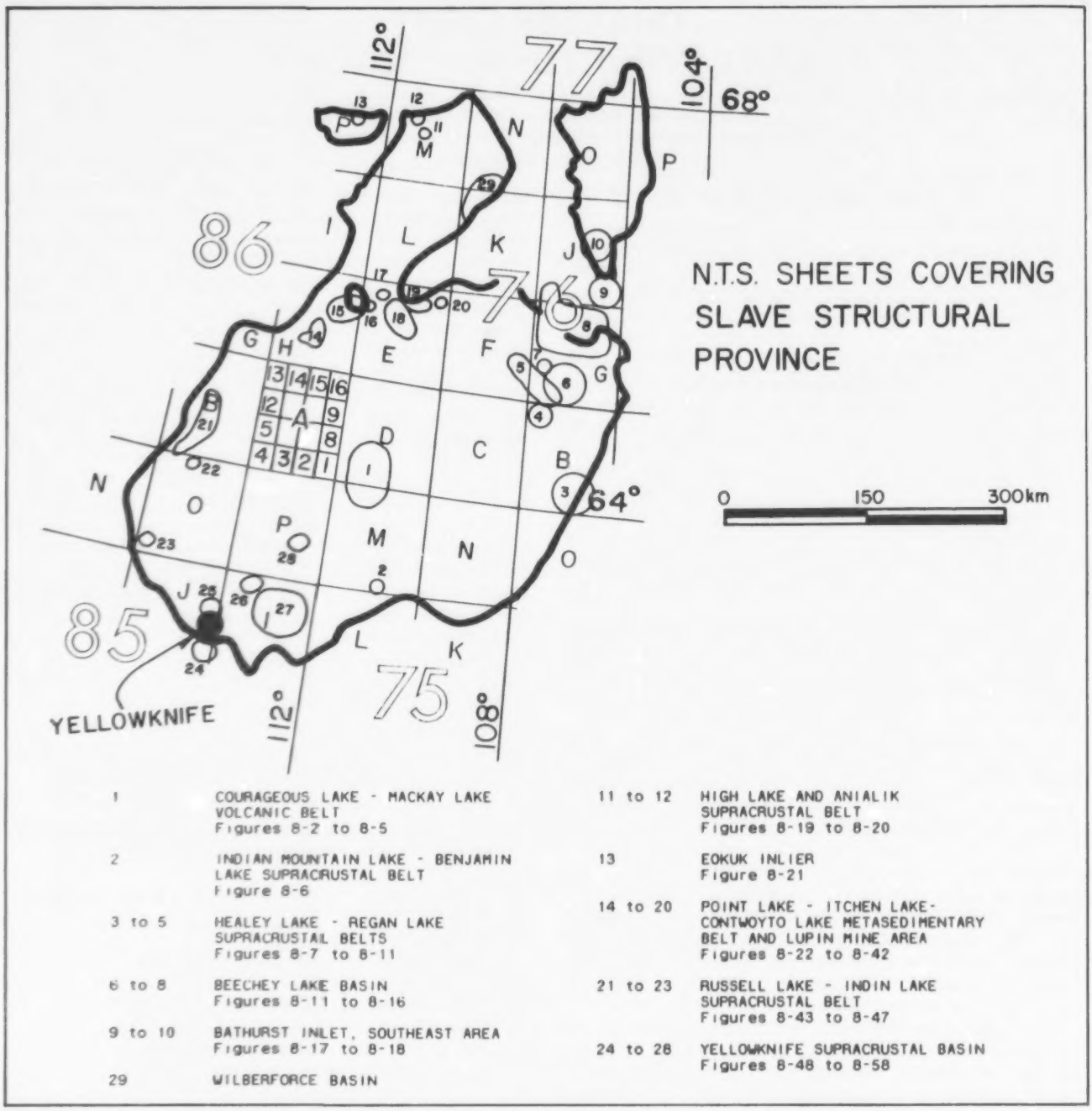

N.T.S. SHEETS COVERING
SLAVE STRUCTURAL
PROVINCE
0 150 300km
YELLOWKNIFE
112°
104°
68°
64°
108°
77
86
76
85
75
1 COURAGEOUS LAKE - MACKAY LAKE VOLCANIC BELT Figures 8-2 to 8-5
2 INDIAN MOUNTAIN LAKE - BENJAMIN LAKE SUPRACRUSTAL BELT Figure 8-6
3 to 5 HEALEY LAKE - REGAN LAKE SUPRACRUSTAL BELTS Figures 8-7 to 8-11
6 to 8 BEECHEY LAKE BASIN Figures 8-11 to 8-16
9 to 10 BATHURST INLET, SOUTHEAST AREA Figures 8-17 to 8-18
29 WILBERFORCE BASIN
11 to 12 HIGH LAKE AND ANIALIK SUPRACRUSTAL BELT Figures 8-19 to 8-20
13 EOKUK INLIER Figure 8-21
14 to 20 POINT LAKE - ITCHEN LAKE-CONTWOYTO LAKE METASEDIMENTARY BELT AND LUPIN MINE AREA Figures 8-22 to 8-42
21 to 23 RUSSELL LAKE - INDIN LAKE SUPRACRUSTAL BELT Figures 8-43 to 8-47
24 to 28 YELLOWKNIFE SUPRACRUSTAL BASIN Figures 8-48 to 8-58

*FIGURE 8-1: Location key to geological figures and NTS sheets covering the Slave Province.*

by granitoid rocks and marginal to a volcanic or supracrustal belt are included under the appropriate belt title.

Properties under headings 1 to 8 were reported by J.B. Seaton. With a few exceptions those under heading 9 by J. Crux and those under headings 10 and 11 by J. Brophy. The exceptions are the reports on claims AU 6, 8, 9, 12, claims AU 15, 18, 19 (under heading 9) and reports on the Spider Lake Project and on the MARLIN claims which were written by J.B. Seaton.

## COURAGEOUS LAKE-MACKAY LAKE VOLCANIC BELT

This belt is roughly 60 km long and 5 km wide and trends northwesterly from the vicinity of Nodinka Narrows, on Mackay Lake, to near the north end of Courageous Lake.

### NOD CLAIMS

Cominco Ltd.
700-409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
75 M/14
63°63'N, 113°05'W

#### REFERENCES

Folinsbee (1949); Henderson (1944); Moore (1956).
DIAND assessment report: 081826.

#### PROPERTY

NOD 1-4.

#### LOCATION

The claims (Fig. 8-2) are 230 km northeasterly from Yellowknife and south of Nodinka Narrows, Mackay Lake.

#### HISTORY

Recorded in March 1983, the claims were acquired by Highwood Resources Ltd., which performed reconnaissance geological mapping, sampling and VLF-EM surveys during 1983.

Cominco optioned the claims from Highwood Resources.

#### DESCRIPTION

The claims (Fig. 8-2) cover a 10 km length of a contact between volcanic and sedimentary rock at the eastern margin of the Courageous Lake-Mackay Lake Volcanic Belt.

#### CURRENT WORK AND RESULTS

Mapping by Cominco in 1984 showed that the claims are underlain, along their western margin, by massive and pillowed mafic volcanics. This unit, in turn, is underlain by an approximately 300 m thick unit of mafic tuff, which is stratigraphically succeeded by a roughly 5 m thick unit of felsic tuff and mixed felsic and mafic tuffs. This predominantly felsic unit is overlain by metagreywacke and biotite schist; both of which underlie the eastern part of the NOD claims.

The mafic volcanics have been intruded by granite and diorite 1 to 3 km west of the NOD claims. Small granitic stocks cut the upper part of the mafic volcanic sequence, but not the felsic unit.

An IP survey along six lines over part of NOD 1, 2 was used to explore the contact between the volcanic and sedimentary rocks. On the most southerly line coincident high chargeability and low resistivity anomalies were recorded at the top of the volcanic sequence.

Assays of samples, taken mainly from the thin felsic unit beneath the sediments, found only weakly anomalous gold concentrations. The gold content of most samples was below the limit of detection.

### MATTHEWS LAKE AREA

Giant Yellowknife Mines Ltd
Box 3000
Yellowknife, NWT, X1A 2M2

Gold
76 D/3
64°00'-64°06'N
111°08'-111°18'W

#### REFERENCES

Lord (1951); Moore (1956); McGlynn (1971); Seaton (1978, 1984); Seaton and Crux (1985); Seaton and Hurdle (1978).
DIAND assessment reports: 061720, 062115 and 080106.

#### PROPERTY

"Salmita" Property Claims: LT 1-3; LUFF 1-4; SALERNO 1-18; TOUGH 1-6.

"Taurcanis" or "Tundra" Property Claims: JEJA 1-6; MAD 1-18; REP 1-12; WIN 1-18.

Roxwell Gold Mines Ltd. Claim: BS 1.

#### LOCATION

The claims are roughly 240 km northeasterly from Yellowknife and lie east of to 5.5 km south-southeast of Matthews Lake (Fig. 8-2).

#### HISTORY

The "Salmita" and "Taurcanis" properties were staked in 1945 and their early history is reported by Lord (1951) and McGlynn (1971). The Salmita property was acquired by Salmita Northwest Mines Ltd. in 1945. The Taurcanis property was optioned to Trans-American Mining Corporation Ltd. in 1945, and transferred to Bulldog Yellowknife Gold Mines Ltd. in 1948. Bulldog Yellowknife was reorganised as Taurcanis Mines Ltd. in 1956 and again as Tundra Gold Mines Ltd. in 1963.

Subsequent developments on the Salmita property are summarized by Seaton (1978, 1984), Seaton and Crux (1985), and Seaton and Hurdle (1978). Giant Yellowknife Mines Ltd. optioned the property from Bluebell Enterprises Ltd. in 1974, commenced sinking a decline in 1975 and started production at Salmita Mine in 1983. Giant Yellowknife Mines Ltd. acquired the Tundra Gold Mines Taurcanis property together with the Tundra Mill (Fig. 8-3), which is used to treat the Salmita ore.

#### DESCRIPTION

The geology of the Matthews Lake area is described by Moore (1956) and the geology of the gold showings by Lord (1951) and Moore (1956). McGlynn (1971) described the Olsen showing on TOUGH 4.

#### CURRENT WORK AND RESULTS

Most drilling in the Matthews Lake area was done on mining leases (to which the claims of the Salmita and Taurcanis properties have been converted) and was not reported as representation work. BS 1 was explored by Giant Yellowknife Mines Ltd. and Cominco Ltd. under option from

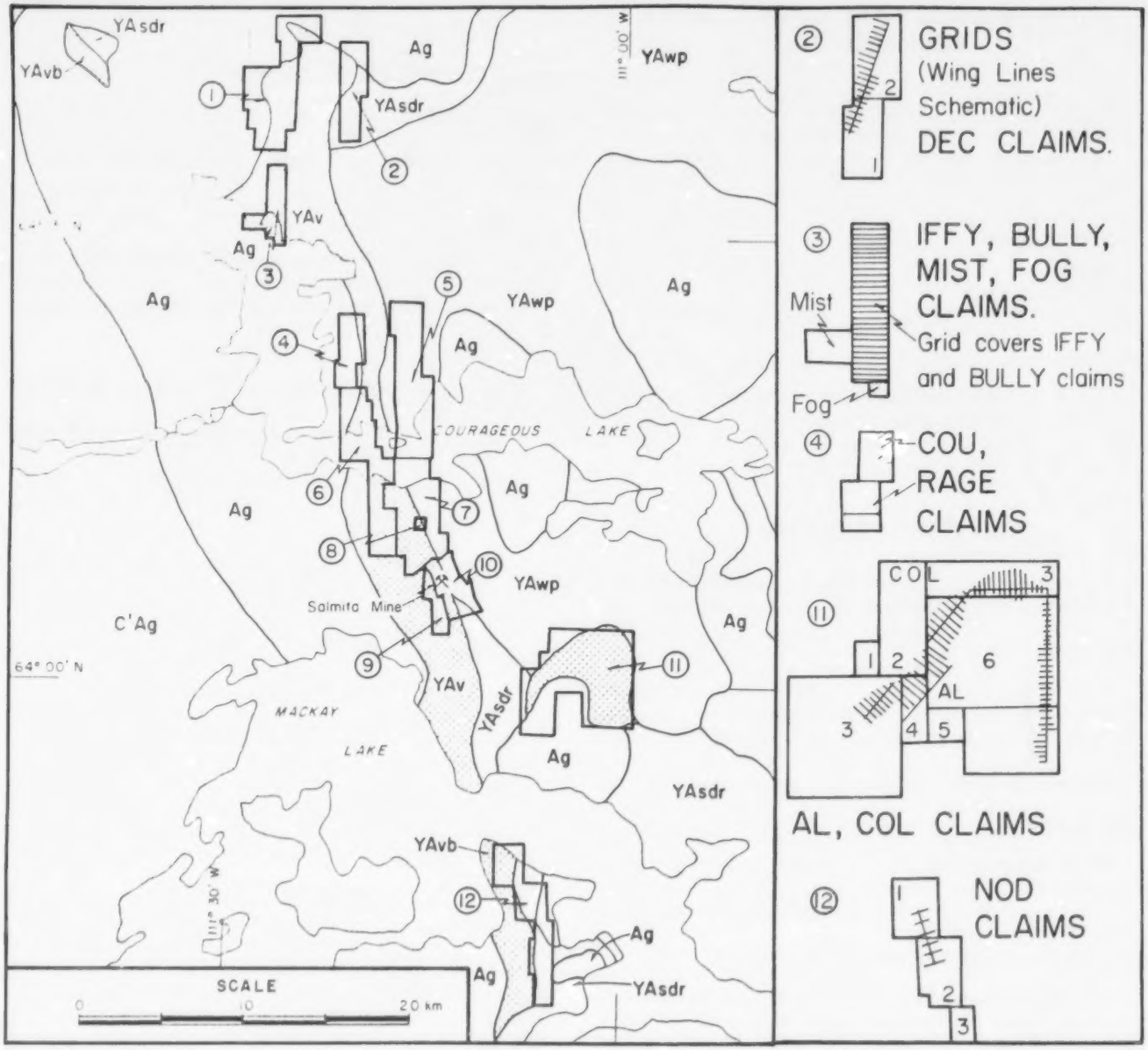



*FIGURE 8-2: Regional geology and properties of the Courageous Lake - Mackay Lake Volcanic Belt (geology from McGlynn, 1977).*

the claim holder, Roxwell Mines Ltd. BS 1 was explored by an IP, resistivity, and magnetic survey prior to drilling in 1984 and 1985.

From June through December 1984, 4263.5 m in 30 holes, and from February through November 1985, 12,535 m in 117 holes were reported drilled in the Matthews Lake area by Giant Yellowknife Mines. The proximity of the drilling done in the Matthews Lake area to the margin of the Courageous Lake-MacKay Lake Volcanic Belt is apparent in Figure 8-3.

## AL AND COL CLAIMS

Placer Development Ltd.
Box 49330, Bentall PO Station
Vancouver, B.C., V7X 1P1

Gold
76 D/3
64°02'N, 111°02'W

### REFERENCES

Dillon-Leitch (1979, 1981); Folinsbee (1949); Henderson (1944).

DIAND assessment report: 081905.

### PROPERTY

AL 3-7, COL 1-3.

LEGEND

ARCHEAN

PLUTONIC

Ag — Quartz diorite, granodiorite, quartz monzonite and granite. In part phyritic. Granitic rocks undivided.

YELLOWKNIFE SUPERGROUP

YAsdr — Cordierite-andalusite-bearing schists and other metamorphic equivalents of Yellowknife Supergroup sedimentary rocks.

YAwp — Greywacke, mudstone, turbidites. Includes minor quartzite, conglomerate, limestone and tuff.

YAvb — Mafic to intermediate flows, tuff, agglomerate with minor undifferentiated felsic volcanic rocks.

YAv — Volcanic rocks, undivided.

C'An / C'Ag — Migmatite, granitic gneisses or granitic rocks that may be in part older than Yellowknife Supergroup.

PROPERTIES

1. FELS, LICH, SIAL, SPAR, TUFF
2. DEC
3. BULLY, FOG, IFFY, MIST
4. COU, RAGE
5. MOG 1,4
6. MOG 2,3: BULL 3,4
7. BERTHA, FAT
8. RED
9. CAROL
10. LUFF, SALERNO, TOUGH
11. AL, COL
12. NOD

## LOCATION

The property (Fig. 8-2) is roughly 5 km north of Mackay Lake, 8 km due east of Tundra Mill and 260 km northeasterly from Yellowknife.

## HISTORY

The claims were staked for Colray Resources Inc.; the AL claims in July 1983 and the COL claims in September 1984. They were later optioned to Placer Development Ltd.

## DESCRIPTION

The AL-COL claim group covers an inlier of metavolcanics about 5 km east of the Courageous Lake - Mackay Lake Volcanic Belt.

The largely mafic volcanics of the inlier have been subjected to doming, peripheral to a granitoid intrusive and its satellite stock. Cleavage and bedding in the volcanics and overlying metasediments strike parallel or subparallel to the intrusive contact, and dip vertically to steeply away from the contact. Pillows and graded beds indicate that the supracrustal rocks young outward from the granitoid intrusion. Metasediments in the southern part of the property are on the high grade side of the cordierite isograd. Folinsbee (1949) and Henderson (1944) regionally mapped the area at 1:253,440. More detailed mapping was done by Dillon-Leitch (1981).

## CURRENT WORK AND RESULTS

A grid, totalling 47 line km, was constructed over a contact between volcanic and sedimentary rocks. Magnetic and VLF-EM surveying and soil and rock sampling were done in search of gold.

Soil sampling (analyses for Mo, Cu, Zn, Pb, Ag, Au, As, Mn, Fe, Sb) did not outline any clearly defined anomalies and only one rock sample was distinctly anomalous (0.79 ppm Au).

Magnetic and VLF-EM surveys totalled 37 line km. A VLF-EM conductor coincides with a gossan-capped chert unit the length of the three adjoining grids (Fig. 8-2). This unit, however, was not found to be significantly auriferous. Other shorter en-echelon conductors were outlined. There is good correlation between VLF-EM conductors and magnetic anomalies.

Though the cherty unit with altered felsic tuff containing pyrite and pyrrhotite gave a geophysical response it was not found to be significantly auriferous.

# GIANT 1 CLAIM

Giant Yellowknife Mines Ltd.
Box 3000
Yellowknife, NWT
X1A 2M2

Gold
76 D/3
64°02'30"N,
111°09'30"W

## REFERENCES

Moore (1956).
DIAND assessment report: 081809.

## PROPERTY

GIANT 1.

## LOCATION

The claim straddles the road from Tundra Mill to the airstrip servicing Salmita Mine, and is roughly 240 km northeasterly from Yellowknife (Fig. 8-3).

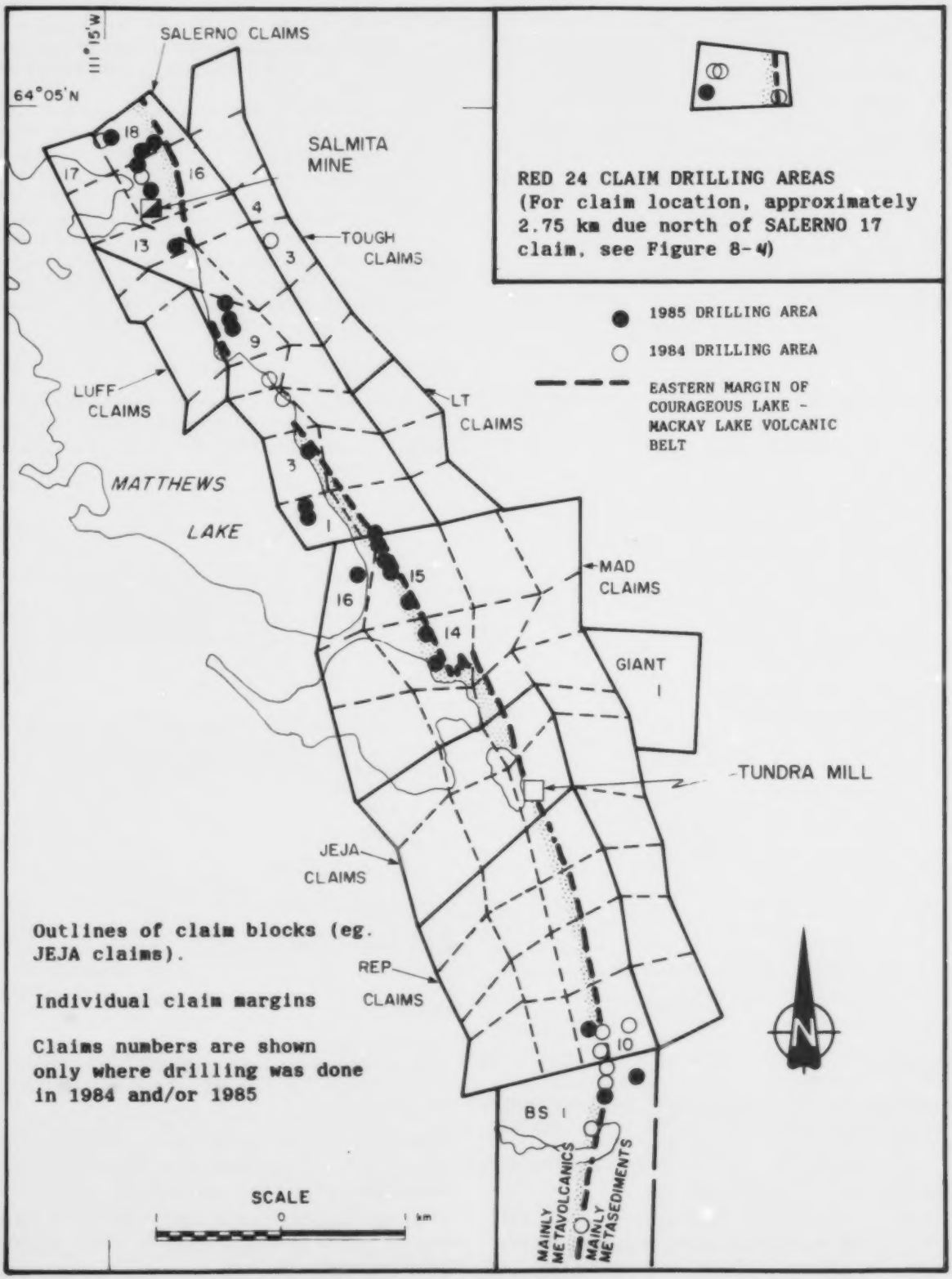



*FIGURE 8-3: Diamond drilling by Giant Yellowknife Mines Ltd. in the Matthews Lake area.*

### HISTORY

GIANT 1 was recorded in November 1982. Work done in 1982 has not been recorded in previous Mineral Industry Reports and is reported here under "Current Work and Results".

### DESCRIPTION

The claim is underlain by Yellowknife Supergroup metasediments and is about 1 km east of the eastern margin of the Courageous Lake-Mackay Lake Volcanic Belt.

### CURRENT WORK AND RESULTS

In 1982, seven X-ray holes were drilled to test overburden, which was mainly glacial sand. Holes completed ranged from 2.08 to 5.14 m in length. A total of 21.46 m was drilled.

## BERTHA 4, CAROL AND OTHER CLAIMS

Noranda Exploration Co. Ltd.
4-2130 Notre Dame Ave.
Winnipeg, Man., R3H 0K1

Gold
76 D/3
64°03'N, 111°14'W

### REFERENCES

Dillon-Leitch (1979, 1981); Folinsbee (1949); Henderson (1944); Seaton (1983a,b, 1984) Seaton and Crux (1985).

DIAND assessment report: 081900.

### PROPERTY

BERTHA 1,4; CAROL 1, 2; 36 FAT claims; 2 SMALL claims; 14 STOUT claims; TALL 87.

### LOCATION

The claims are at Matthews Lake (Fig. 8-4), 235 km northeasterly from Yellowknife. The property adjoins that of Salmita Mine.

### HISTORY

Gold was discovered in the Salmita area in 1939. In the forties the property was staked as the PONDO, B-7 and CL claims.

In 1976, at a time when interest in the Courageous Lake-Mackay Lake Volcanic Belt was focussed on its silver-base metal potential, Noranda Exploration Company Ltd. flew a combined EM and magnetic survey of the belt in search of massive sulphide deposits. The survey was followed by extensive staking and exploration (Seaton 1983a,b, 1984, 1985). In 1981, exploration emphasis shifted from silver and base metals to gold.

The SMALL claims were recorded in November 1976, and the FAT, STOUT and TALL claims in January and April 1977. Bertha 1 was recorded in July 1981; Bertha 4 in July 1983.

CAROL 1 and 2 were recorded in August 1983 to acquire ground left open when the MAT claims lapsed.

Work in 1983 on BERTHA 1 and the five adjoining claims is summarized in Seaton and Crux (1985).

### DESCRIPTION

Much of the property is covered by Matthews Lake (Fig. 8-4), and is apparently largely underlain by a belt of felsic volcanics. In the western part of the property, mafic volcanics stratigraphically underlie the felsic volcanics and are intruded by quartz porphyry and quartz-feldspar porphyry. In the northeastern part, along the eastern margin of the Courageous Lake-Mackay Lake Volcanic Belt, metasediments (greywacke, phyllite and mica schist) overlie the felsic volcanics (Moore, 1956).

The Courageous Lake-Mackay Lake Volcanic Belt forms a steeply dipping, easterly facing homoclinal sequence with minor local folds. The regional geology is shown in Folinsbee (1949) and Henderson (1944). The most recent, detailed work, other than that found in assessment reports, is by Dillon-Leitch (1979, 1981).

### CURRENT WORK AND RESULTS

Work in 1984 and 1985 was in joint venture with Getty Mines Ltd. In 1984, work was concentrated on and around the revised FAT 4 grid that lies mainly on BERTHA 1 between Courageous and Matthews Lakes. BERTHA 1 and adjoining parts of the FAT claim block were converted to mining leases in July 1984.

During the spring of 1984, 25 NQ diamond drill holes tested the main auriferous zone on the FAT 4 grid and targets outside the zone. During the summer of 1984 work in and adjacent to the FAT 4 grid comprised grid revision and expansion, detailed geological remapping, sampling and trenching, whole rock analysis, and IP and horizontal loop EM surveys of selected areas. Magnetic susceptibility of all drill core obtained during 1983 and 1984 was determined. Ground control markers for a black and white and colour aerial photographic survey were laid out, and a contoured photo-map subsequently obtained. In the fall of 1984, 11 more NQ drill holes were completed on the main zone as well as two exploratory holes on targets outside it. Drilling during 1984 in the FAT 4 grid area totalled 6243 m.

During 1985, a grid adjoining and lying south of the FAT 4 grid was constructed. The grid totals 131.4 line km. Much of the grid was laid out over the ice on Matthews Lake (Fig. 8-4). The grid was surveyed by magnetic and VLF-EM surveys.

The magnetic survey outlined areas of mafic and felsic volcanics and a northerly trending dyke (presumably diabase). Magnetic features of lesser extent are interpreted to be due to pods of mafic rock, pyrrhotite concentrations, or, in one case, an alteration zone within felsic volcanics.

Several VLF-EM conductors were delineated, some associated with magnetic highs and some probably coincident with contacts between mafic and felsic volcanics.

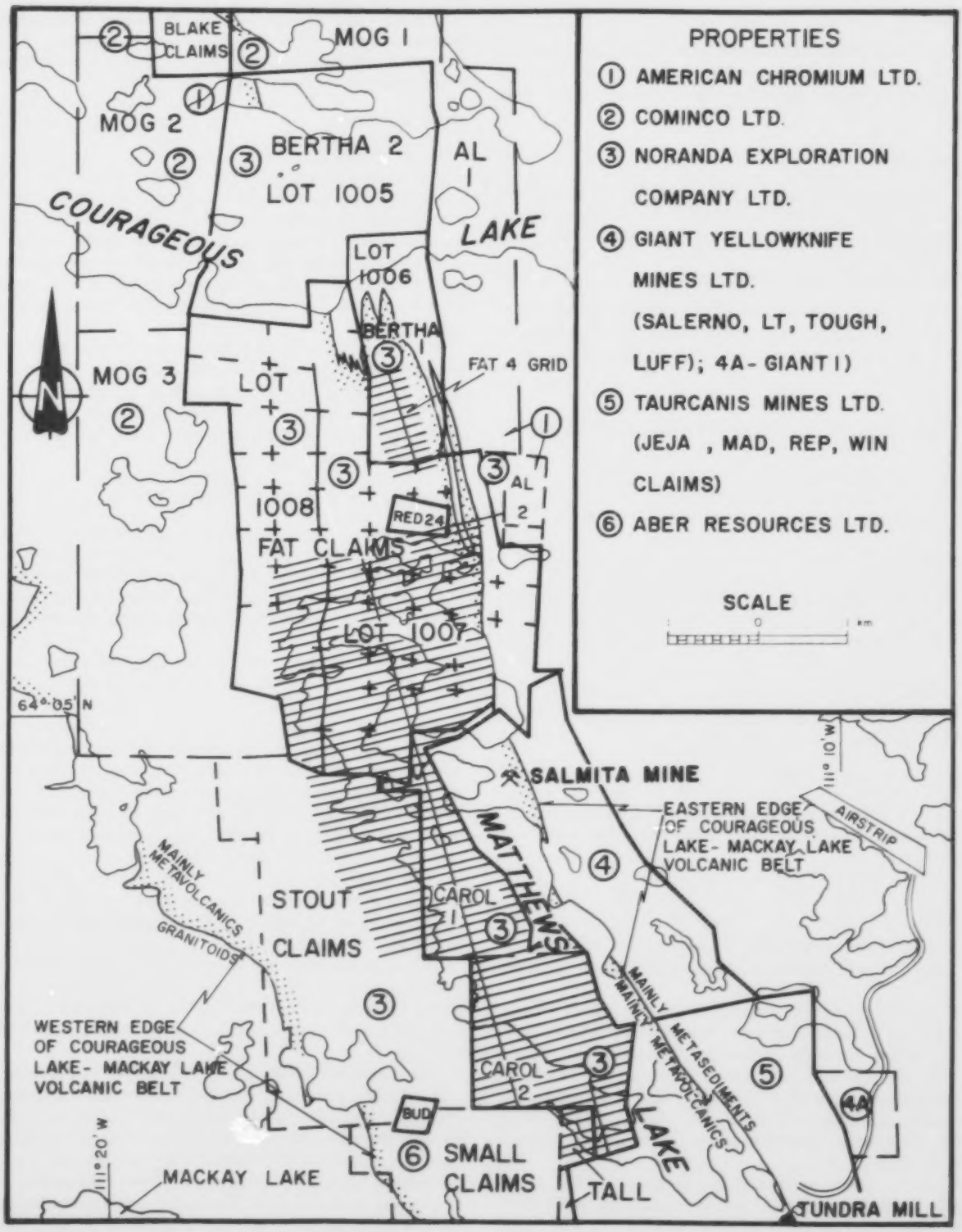



*FIGURE 8-4: Grids on the BERTHA AND CAROL claims.*

## MOG CLAIMS

Cominco Ltd.
700-409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 D/3
64°11'N, 111°17'W

### REFERENCES

Lord (1951); Moore (1956).
DIAND assessment report: 081832.

### PROPERTY

BULL 3, 4; MOG 1-4.

### LOCATION

The claims are roughly 250 km northeasterly from Yellowknife at Courageous Lake (Fig. 8-5).

### HISTORY

MOG 1 and 4 cover part of an area staked in 1946 as the MINT group, and were acquired by Payne Yellowknife Gold Mines Ltd. later that year.

In 1947, Payne Yellowknife Gold Mines explored a gold showing near the common boundary of MINT 11 and 12. Three pits were excavated and two holes diamond drilled. Payne Yellowknife Gold Mines also reported visible gold on MINT 4, where they excavated a 10 m long trench and drilled two holes. On MINT 57 they noted aurifierous float, but drilling two holes failed to find its source.

MOG 1-4 and BULL 3 were recorded for Mr. Hugh Mogensen of Calgary, Alberta in July 1983. In May 1984, Mogensen optioned the claims to Cominco.

### DESCRIPTION

Moore (1956) mapped and described the geology of the Courageous-Matthews Lakes area. Lord (1951) described the gold showings. The geology of the property, simplified from Moore (1956), is shown in Figure 8-5. The northern two MOG claims (MOG 2 and 3) are mainly underlain by mafic volcanics. The MINT group showings are in the area underlain by metasediments; the positions of MINT 4, 11 and 57 are indicated in Figure 8-5.

BULL 3 is largely underlain by mafic volcanics; and BULL 4, by mafic and less abundant felsic volcanics. The northwestern part of BULL 4 is underlain by granodiorite.

### CURRENT WORK AND RESULTS

In 1984, two grids (Fig. 8-5) were established comprising 41 line km on MOG 1 and 4, and 27 line km mainly on MOG 4. MOG 2 is largely water covered. The grids were mapped and explored by magnetic and VLF-EM surveys. The northern grid area is underlain by metasediments, intruded by northerly to north- northwesterly trending diabase dykes. The southern grid is underlain by mafic volcanics, except for small areas underlain by gabbro and diabase. Although the diabase outcrops sparsely on the southern grid, it is indicated below overburden by linear magnetic features, as it is on the northern grid.

A VLF-EM anomaly along the western margin of MOG 4 is close to a contact between felsic volcanic and metasedimentary rocks. Two parallel, northerly trending, discontinuous conductive zones were delineated on the southern grid. These coincide, in part, with rusty pyritic zones in mafic volcanics.

Linear magnetic highs were outlined and are probably caused by diabase dykes that trend northerly to northwesterly. Samples taken from rusty frost-heaved material contained up to 178 ppb Au, (on the southern grid end of the eastern conductor). Anomalously high gold assays were also obtained from the sheared contact zones between small arsenopyrite-bearing, quartz-feldspar porphyry dykes and quartz veins, which cut metasediments in the northern half of the property.

In the spring of 1985, magnetic, VLF-EM and IP surveys over the ice of Courageous Lake outlined local coincident anomalies on MOG 2. During the summer, these surveys were extended by reconnaissance lines between lakes onto BULL 3 and BULL 4 and adjacent ground. Additional geophysical anomalies were found.

## COU, RAGE CLAIMS

Placer Development Ltd.
Box 49330, Bentall PO Station
Vancouver, B.C., V7X 1P1

Gold
76 D/3
64°12'N, 111°22'W

### REFERENCES

Dillon-Leitch (1979, 1981); Folinsbee (1949); Henderson (1944).
DIAND assessment report: 081912.

### PROPERTY

COU, RAGE.

### HISTORY

The claims were recorded in August 1983.

### LOCATION

The claims (Fig. 8-2) are slightly east of the north arm of Courageous Lake, and 245 km northeasterly from Yellowknife.

### DESCRIPTION

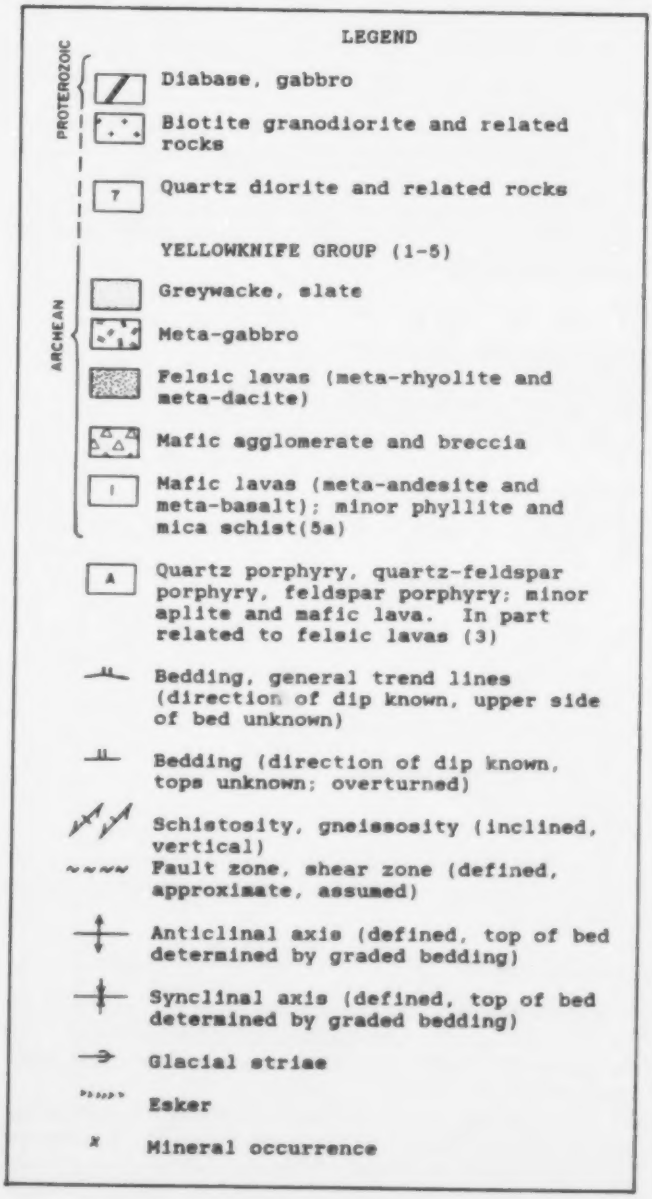
The claims are on the western margin of the northern part of the Courageous Lake-Mackay Lake Volcanic Belt, the broad regional setting of which is shown by Folinsbee (1949) and Henderson (1944).

The entire property is underlain by biotite granite and biotite granodiorite, except for relatively small parts of the northern and eastern margins of COU where mafic volcanics and felsic volcanics outcrop respectively (Dillon-Leitch, 1981). The felsic volcanics are intruded by a body of metagabbro at the volcanic granitoid contact (Fig. 3-2).

## CURRENT WORK AND RESULTS

Three rock samples, taken from the metagabbro near the eastern margin of COU, showed background metal contents (analyses for Mo, Cu, Zn, Pb, Ag, Au, As, Mn, Fe, Sb) typical of the Courageous Lake-Mackay Lake Volcanic Belt.

Of 53 soil samples taken, 35 were from the northeastern part of COU and the remainder from RAGE. Three samples have slightly anomalous gold contents, but all three are single point anomalies.


LEGEND
PROTEROZOIC
ARCHEAN
Diabase, gabbro
Biotite granodiorite and related rocks
Quartz diorite and related rocks
YELLOWKNIFE GROUP (1-5)
Greywacke, slate
Meta-gabbro
Felsic lavas (meta-rhyolite and meta-dacite)
Mafic agglomerate and breccia
Mafic lavas (meta-andesite and meta-basalt); minor phyllite and mica schist(5a)
Quartz porphyry, quartz-feldspar porphyry, feldspar porphyry; minor aplite and mafic lava. In part related to felsic lavas (3)
Bedding, general trend lines (direction of dip known, upper side of bed unknown)
Bedding (direction of dip known, tops unknown; overturned)
Schistosity, gneissosity (inclined, vertical)
Fault zone, shear zone (defined, approximate, assumed)
Anticlinal axis (defined, top of bed determined by graded bedding)
Synclinal axis (defined, top of bed determined by graded bedding)
Glacial striae
Esker
Mineral occurrence

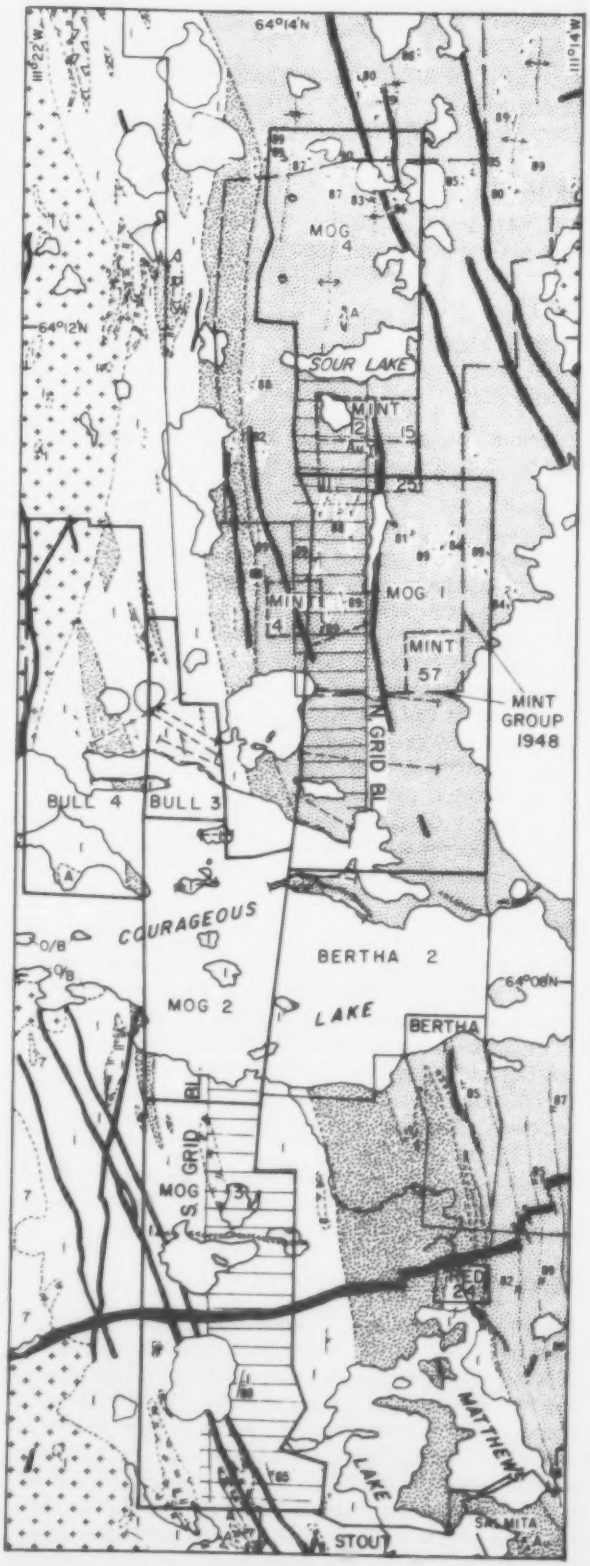



*FIGURE 8-5: Geology of the MOG, BULL, MINT and other claims, Courageous Lake (geology from Moore, 1956).*

## BULLY, FOG, IFFY, MIST CLAIMS

Placer Development Ltd.
Box 49330, Bentall PO Station
Vancouver, B.C., V7X 1P1

Gold
76 D/5,6
64°17'N, 111°27'W

### REFERENCES

Moore (1956); Dillon Leitch (1979, 1981).

### PROPERTY

BULLY, FOG, IFFY, MIST claims.
DIAND assessment report: 081906.

### LOCATION

IFFY, BULLY and MIST are on the northeast shore of Courageous Lake. FOG covers most of an island in Courageous Lake. The claims are about 260 km northeasterly from Yellowknife.

### HISTORY

The claims were recorded in September 1983 for Colray Resources Inc., and later optioned to Placer Development Ltd.

### DESCRIPTION

The property is underlain by intermediate to mafic metavolcanics, minor amounts of felsic metavolcanics, syn-volcanic intrusions of metagabbro and intrusive biotite granite (Dillon-Leitch, 1981). The mafic volcanic rocks are locally sheared and carbonatized.

### CURRENT WORK AND RESULTS

Work in 1985 comprised: construction of 22.5 line km of grid (Fig. 8-2), reconnaissance geological mapping and prospecting, soil sampling (analyses for Mo, Cu, Zn, Pb, Ag, Au, As, Mn, Fe, Sb) and a combined magnetic and VLF-EM survey of the grid.

A northeasterly to northerly trending foliation in metagabbro and metabasalt is locally transitional into well defined shear and fracture systems which are commonly carbonatized and in places weakly silicified. Poorly developed stockworks of quartz and carbonate veins, less than 20 cm thick, were found in the shear and fracture systems. Small amounts of sulphides, mainly pyrite but locally chalcopyrite, sphalerite and galena are associated with the quartz veins.

The soil sampling survey revealed only single sample anomalies. Several conductors were delineated by the VLF-EM survey. The strongest and longest conductor trends north-northwesterly through the northeastern part of the grid and coincides with a contact between massive, locally gossanous, basalt and a 50 m wide cherty metasedimentary unit enclosed within the volcanics.

## FELS, LICH, SIAL, SPAR, TUFF CLAIMS

Stone Petroleums Ltd.
1730 Elveden House,
717-7th Ave. SW
Calgary, Alta., T2P 0Z3

Gold
76 D/5,6
64°21'N, 111°28'W

### REFERENCES

DIAND assessment report: 081916.

### PROPERTY

FELS, LICH, SIAL, SPAR, TUFF claims.

### LOCATION

The property (Fig. 8-2) is roughly 255 km northeasterly from Yellowknife and 28 km northwesterly from Salmita Mine.

### HISTORY

The claims were recorded in July 1983 for R.E. Wolf, who holds them in trust for Stone Petroleums Ltd.

### DESCRIPTION

The claims are on the western edge of the northern end of the Courageous Lake - Mackay Lake Volcanic Belt. The claims straddle the contact between intrusive granite to the west and metavolcanics to the east (Fig. 8-2).

### CURRENT WORK AND RESULTS

In 1985, the property was geologically mapped at 1:1200. One hundred and fifty nine rock samples were taken from numerous outcrops and from 22 quartz veins found during mapping. One hundred and eighty-one soil samples were taken mostly from frost boils. Rock and frost boil samples were analysed for gold, arsenic, copper and lead. Thin sections of 15 rock samples were examined petrographically.

The property is mainly underlain by mafic metavolcanics, except for the two most northerly claims where granite predominates. In order of decreasing abundance, mafic volcanics, intermediate volcanics, metasediments and felsic volcanics underlie the other parts of the claims. Metasediments are most abundant in the western parts of FELS and LICH. Zones of disseminated to massive sulphides (mainly pyrrhotite) were frequently observed within and adjacent to quartzite beds and in felsic metatuff, but were traced by reconnaissance magnetic surveying for rarely more than 200 m. Such sulphide zones contain only trace amounts of gold.

Rock and frostboil samples revealed that several areas with anomalous concentrations of gold also had above background concentrations of other elements.

## DEC CLAIMS

Placer Development Ltd.
Box 49330, Bentall PO Station
Vancouver, B.C., V7X 1P1

Gold
76 D/6
64°21'N, 111°23'W

### REFERENCES

Dillon-Leitch (1979, 1981); Folinsbee (1949).
DIAND assessment report: 081907.

### PROPERTY

DEC 1, 2.

### LOCATION

The claims are approximately 255 km northeasterly from Yellowknife and 5 km northwest of Seahorse Lake (Fig. 8-2).

### HISTORY

DEC 1 and 2 were recorded in July 1983 for Colray Resources Inc. and were later optioned to Placer Development Ltd.

### DESCRIPTION

The property lies on the eastern margin of the northern end of the Courageous Lake - Mackay Lake Volcanic Belt.

Mapping by Dillon-Leitch (1981) shows the eastern and southern part of the property to be underlain by Yellowknife Supergroup metasediments, and the western part by mafic metavolcanics, which are intruded by biotite granite in the northern part of the property. The andalusite and sillimanite isograds trend west-northwesterly through the southern part of the property with metamorphic grade increasing northwards.

### CURRENT WORK AND RESULTS

Work in 1985 comprised grid construction, and geological mapping, rock sampling, soil sampling and VLF-EM and magnetic surveying on the grid.

The grid baseline (4.8 km long) (Fig. 8-2) trends north-northeasterly and is close to the volcanic-sediment contact for most of its length. The northern end of the grid is underlain by biotite granite. Placer Development geologists interpret the contact to be a fault, which displaces the granite contact in the northern part of the grid.

Rock and soil samples were analyzed for molybdenum, copper, zinc, lead, silver, gold, arsenic, manganese, iron and antimony. Several gossan-capped concentrations of pyrite and pyrrhotite with anomalous copper, lead and zinc were mapped in the metavolcanics. Eight arsenopyrite showings in metasediments had geochemically anomalous amounts of gold. The arsenopyrite is commonly disseminated in the silicified wall rock of quartz veins.

A VLF-EM conductor, traced the full length of the grid, is roughly coincident with the volcanic-sediment contact. Several shorter conductors were outlined and have been interpreted as caused by pyrite-pyrrhotite zones in the metavolcanics. The conductors generally correlate well with magnetic anomalies.

## INDIAN MOUNTAIN LAKE-BENJAMIN LAKE SUPRACRUSTAL BELT

The Indian Mountain Lake-Benjamin Lake Supracrustal Belt extends 65 km north of the East Arm of Great Slave Lake. It has a maximum width of 25 km at its southern end and tapers northward to a sinuous "tail" of metasediments at its northern end. The Belt is flanked by granitoid rocks. Volcanic rocks are a minor component of the Belt and are generally confined at or near its western margin, where the largest exposure of metavolcanics flanks an oval area underlain by probable pre-Yellowknife Supergroup basement. The area has been mapped by Henderson (1944) and by Stockwell and others (1968) at 1:253,440 and that part covered by NTS sheet 75 M/2 by Heywood and Davidson (1969) at 1:50,000.

## VOO 1 CLAIM

Domego Resources Ltd.
208, 372 Bay St.
Toronto, Ont., M5H 2W9

Copper, Lead, Zinc, Gold
75 M/2
63°02'N, 110°58'W

### REFERENCES

Heywood and Davidson (1969); Johnson (1974); McGlynn (1971); Thorpe (1966, 1972).

### PROPERTY

VOO 1.

### LOCATION

The claim covers parts of "Kennedy Lake", "BB Lake" and intervening and adjacent ground (Fig. 8-6), and is 185 km east-northeasterly from Yellowknife. It is roughly 5 km south-southeasterly from Indian Mountain Lake.

### HISTORY

The ground covered by VOO 1 was staked in 1948 as part of an earlier group of 21 VOO claims. The adjoining BB claim group, now held as a mining lease by Initiative Explorations Ltd., was recorded two months earlier than the VOO group, in August 1948.

Exploration of the BB claims resulted in the discovery of two mineral deposits. One of these, the BB Zone, was first drilled by Hollinger Gold Mines Ltd. in 1948; the other, the Kennedy Lake Zone, was discovered by International Mine Services Ltd. in 1966 by drilling a geophysical anomaly beneath Kennedy Lake. The exploration history is outlined in McGlynn (1971) and Thorpe (1966, 1972).

Johnson (1974) reported the BB Zone to contain 879,984 t (970,000 tons) grading 9.5% Zn, 0.7% Pb, and 116.6 g/t Ag (3.4 oz/ton), and the Kennedy Lake Zone to contain 7.3% Zn, 1.1% Pb and 137.1 g/t Ag (4.0 oz/t).

VOO 1 was recorded in March 1983.

### DESCRIPTION

Figure 8-6 shows the geology of VOO 1 simplified from Heywood and Davidson (1969). Locations of mineral deposits

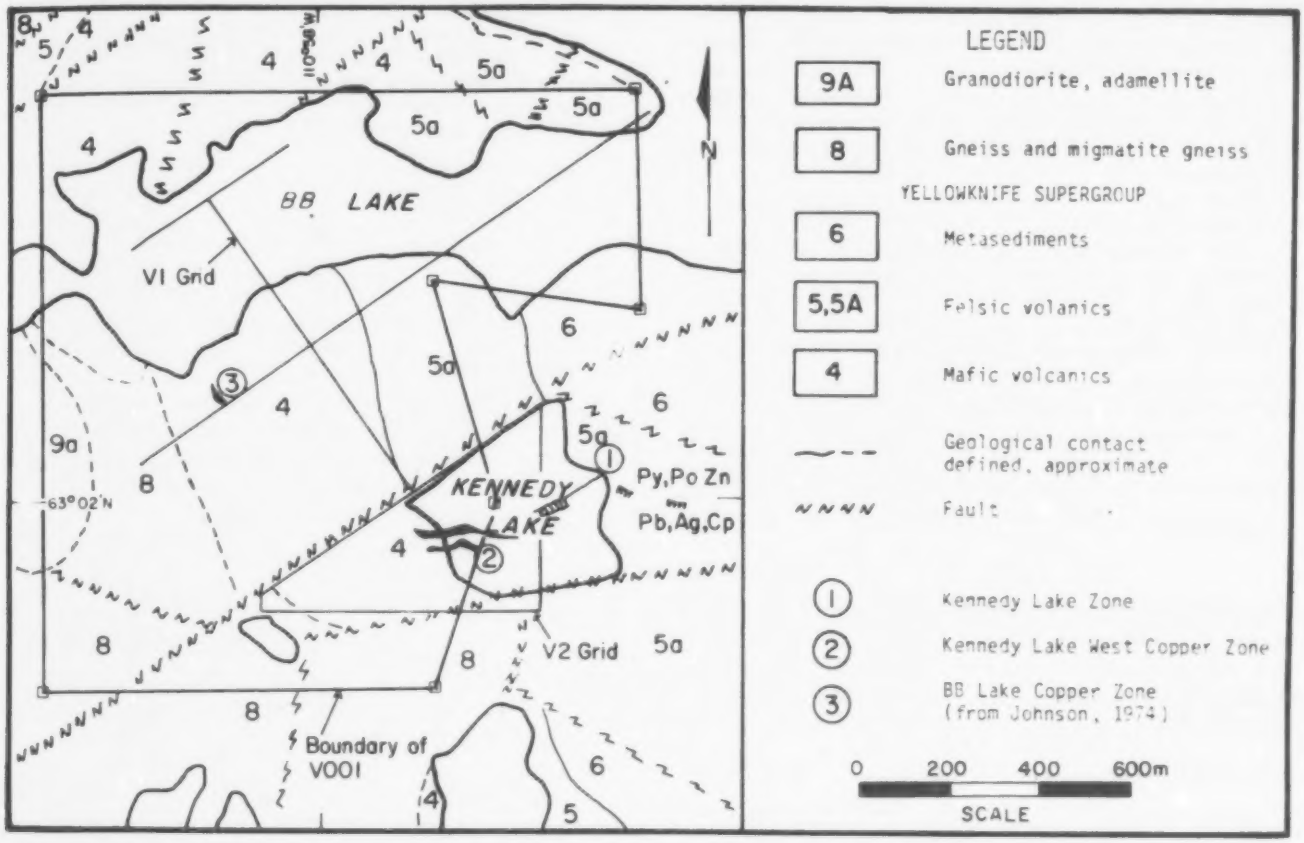



*FIGURE 8-6: Geology of the VOO 1 claim, BB and Kennedy Lakes area (geology modified from Heywood and Davidson, 1969).*

are from Johnson (1974). The BB Zone is mapped by Johnson as roughly 550 m east of the Kennedy Lake Zone and thus plots slightly outside the area covered by Figure 8-6.

Johnson (1974) shows the BB Lake Copper Zone, the Kennedy Lake West Copper Zone, the Kennedy Lake Zone and the BB Zone as concordant lens-like bodies at progressively higher stratigraphic levels, assuming the sequence is from mafic to felsic towards a volcanic-sediment contact northeast of Kennedy Lake. The BB Lake Copper Zone is at the contact between mafic tuff and intermediate pillow lava, the Kennedy Lake West Copper Zone in intermediate volcanics and the Kennedy Lake Zone at and near the contact between intermediate and felsic volcanics. The BB Zone has been mapped as hosted by exhalative carbonate and exhalative pyritic and siliceous rocks, enclosed in predominantly felsic volcanics.

A broad alteration zone has been outlined around the BB Lake Copper Zone, the southeastern faulted continuation of which extends at least to the west end of the Kennedy Lake West Copper Zone and probably under Kennedy Lake to the BB Zone. Several, probably related, areas of alteration have been mapped between the BB Copper Zone and Kennedy Lake.

Johnson (1974) mapped two types of alteration: the first, in which garnet is abundant, is characterized by quartz, cordierite, biotite, muscovite, cummingtonite, anthophyllite, sillimanite, spinel, ilmenite, with chalcopyrite and pyrrhotite locally abundant; the second, which tends to occur peripherally to the first or in discrete smaller parallel zones, is characterized by the absence of garnet and varying abundance of quartz, biotite, muscovite, chlorite and sillimanite. Magnetite is found locally in the inner zone of alteration which together with the sulphides, could be responsible for geophysical anomalies.

The rocks have been metamorphosed to amphibolite facies.

The volcanics, which host the mineral zones in the Kennedy Lake-BB Lake area, appear to have been folded into a tight isoclinal structure and then refolded into an open S-shaped fold of about 1500 m wavelength. The anticlinal and synclinal parts of the second generation folds plunge steeply to the northeast. The mineral zones have probably been stretched parallel to a steep northeasterly plunging lineation.

## CURRENT WORK AND RESULTS

Magnetic and horizontal loop EM surveys were completed on two grids. The V-2 grid covers most of Kennedy Lake. The V-1 grid covers a larger area to the northwest, extending from the V-2 grid to near the northern shore of BB Lake.

Horizontal loop EM surveying (Maxmin at 3555 Hz and 444 Hz with stations at 100 m intervals), outlined the zone of base metal copper deposits and associated alteration that extends across Kennedy Lake. The Kennedy Lake Zone conductor coincides with a moderate magnetic high. A conductor

with strong magnetic correlation on the V-1 grid is unexplained and is in an area underlain by felsic volcanics but near the volcanic-sediment contact.

## HEALEY LAKE-REGAN LAKE SUPRACRUSTAL BELT

A northwest trending branch of the northerly trending Healey Lake Supracrustal Belt extends from Healey Lake to Tarantula Lake and thence northerly to the east of the Back River Volcanic Complex to Regan Lake. The northwesterly striking supracrustal rocks include felsic to intermediate volcanics, flanked to the southwest by metasediments, and to the northeast by granitoid gneisses ranging in composition from diorite to granite (Henderson and Thompson, 1982).

In the Regan Lake area, Yellowknife Supergroup metasediments fill the gap between the Back River Volcanic Complex and the Hackett River Volcanic Belt. Locally the metasediments contain iron formation, which in places is auriferous.

## PROSPECTING PERMITS 814-818

Kidd Creek Mines Ltd.
Box 175, Suite 5000
Commerce Court West
Toronto, Ont., M5L 1E7

Gold
76 B/2,7
64°15'N, 106°45'W

### REFERENCES

Henderson and Thompson (1981, 1982); Henderson and others (1982); James (1985); Seaton and Crux (1985).

DIAND assessment reports: 081655, 081866, 081867.

### PROPERTY

Prospecting Permits 814-818.

### LOCATION

The prospecting permits are at or near Healey Lake, 435 km northeasterly from Yellowknife (Fig. 8-7). Arms of Healey Lake extend into all permits except for Prospecting Permit 815.

### HISTORY

Following 1:50,000 regional geological mapping, prospecting and sampling in 1981, Kidd Creek Mines applied for the permits, which were granted in February 1982. Main exploration targets were metamorphosed auriferous iron formation and volcanogenic base metals deposits.

Work in 1982 comprised 1:20,000 scale geological mapping, and an airborne EM (Input) and magnetic survey (Seaton and Crux, 1985).

### DESCRIPTION

The geology of the Healey Lake area is been described by Henderson and Thompson (1981, 1982) and by Henderson and others (1982). The geology of the Moraine Lake area and the Thelon Front, which adjoins the Healey Lake area to the east, is described by James (1985).

### CURRENT WORK AND RESULTS

In 1984 geological mapping, sampling and geophysical surveys were conducted on several grids and a gold showing was trenched. Grid and work locations are shown in Figure 8-7 and survey data are shown in Table 8-1.

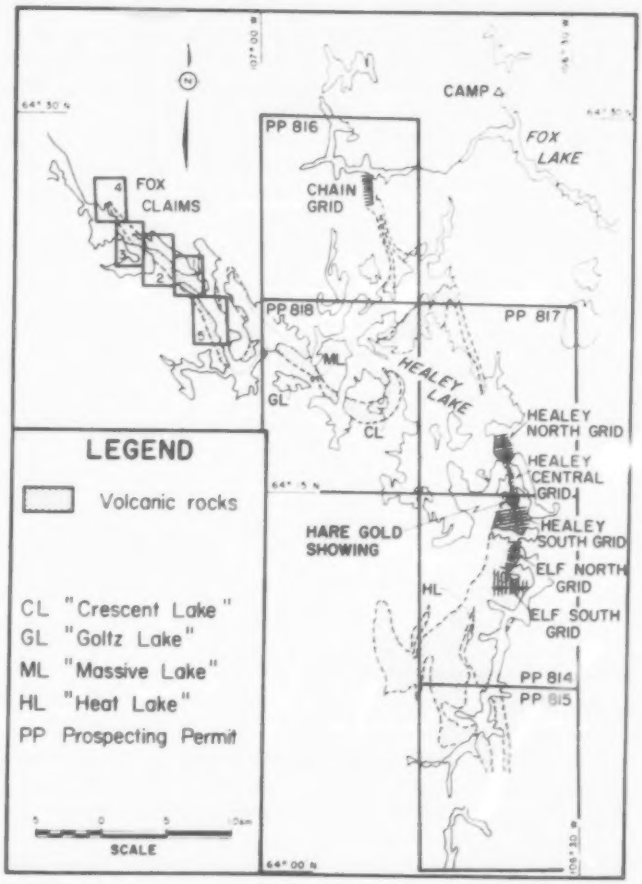



*FIGURE 8-7: Prospecting Permits 814-818 and FOX claims, Healey Lake area.*

Results of the surveys were somewhat discouraging. Visible gold was reported from the Hare Showing, but assays from the trenches showed patchy gold concentrations with most panel samples assaying less than 5 ppb Au.

Sampling in the South Arm Area showed that anomalously high gold concentrations were erratic in distribution and associated with arsenopyrite and sericitic alteration. In this area, mapping revealed garnet amphibolite layers and large shear zones enclosed within metasediments.

In the Healey Lake-Crescent Lake area, only one sample (from a frost heaved quartz veined rock) was found to have anomalously high gold content.

In that part of the predominantly intermediate to felsic Healey Lake Volcanic Belt explored by Kidd Creek Mines in 1984, rocks are of amphibolite metamorphic grade. The metasediments flanking the Chain Grid (Fig. 8-7) to its east are migmatitic.

Some information on grid geology and on grid geophysics, as recorded by Kidd Creek Mines, is shown in Table 8-1.

*TABLE 8-1: Work done on grids on Prospecting Permits 814-818 in 1984.*

| GRID/AREA | GEOLOGY & SAMPLES | MAG | VLF | HLEM |
|---|---|---|---|---|
| ELF SOUTH | X | | | |
| ELF NORTH | X | | | |
| HEALEY LAKE S | X* | X | X | X |
| HEALEY L CENT | X | X | X | X |
| HEALEY LAKE N | X | X | X | X |
| S ARM AREA | X | | | |
| HEALEY LAKE CRESCENT LAKE | X | | | |

* *Work included trenching of the Hare gold showing in the northern half of the grid.*

In summary, although geological mapping, sampling, EM and magnetic surveys of the exploration area delineated numerous sulphide-bearing amphibolite and sheared or altered zones, analyses of samples revealed that anomalous concentrations of gold were generally unspectacular and scattered. Significantly, the only showing with visible gold was low in sulphides and did not present a geophysical target.

## BR 1 CLAIM

Back River Joint Venture
c/o Trigg, Woollett, Olson
Consulting Ltd.
10504 - 103 St.
Edmonton, Alta., T5H 2V4

Gold
76 B/13
68°52'N, 107°43'W

### REFERENCES

Henderson (1982); Lambert (1978, 1981); Moore (1977); Seaton (1978); Schiller (1965); Schiller and Hornbrook (1964).

DIAND assessment reports: 017110, 017111, 017112, 017114, 017428, 061438, 080255, 080292, 081821.

### PROPERTY

BR 1.

### LOCATION

The property (Fig. 8-8) is roughly 435 km northeasterly from Yellowknife and close to the west bank of the Back River.

### HISTORY

The exploration history of the area, commencing in 1961 and continuing into the mid-seventies, has been summarized by Schiller and Hornbrook (1964), Schiller (1965), Seaton (1978) and documented in the several DIAND assessment reports listed above.

Work by the Back River Joint Venture in 1983 consisted of 1:1000 geological mapping, prospecting and rock and soil sampling over a grid (Fig. 8-8). Soil samples were analyzed for gold and arsenic.

### DESCRIPTION

The regional geology has been described, mapped and compiled by Lambert (1978, 1981) and by Henderson (1982).

Mapping of the grid on the BR 1 claim in 1983 (DIAND assessment report 081821) showed it to be underlain by mainly dacitic and andesitic volcanics. Enclosed in the volcanic sequence is an iron formation unit, which comprises magnetite-hematite-chert iron formation, pyritiferous black carbonaceous slate and black laminated chert. Moore (1977) wrote an M.Sc. thesis on the geology and geochemistry of gold-bearing iron formation and associated rocks in the area.

### CURRENT WORK AND RESULTS

Sampling in 1983 showed that both volcanics and sediments on the property host asurifierous quartz veins, but not in sufficient number, size or grade to encourage further work.

## MATE 1 CLAIM

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Gold
76 B/13
64°53'N, 107°41'W

### REFERENCES

Lambert (1978, 1981); Lambert and Henderson (1980); Schiller (1965); Schiller and Hornbrook (1964); Seaton (1978); Seaton and Crux (1985).

DIAND assessment reports: 017093, 017111, 017114, 017428, 061313, 061438, 080255, 080292, 081367, 081808.

### PROPERTY

MATE 1.

### LOCATION

The claim straddles the Back River (Fig. 8-9), 430 km northeasterly from Yellowknife.

### HISTORY

Cominco Ltd. discovered gold showings close to the Back River in 1961, and staked them as the TOBY and RUBY claim groups. The initial discovery (D Zone showing) was explored by diamond drilling (14 holes, totalling 1428 m), delineating a north-northeasterly trending zone of locally pyritic quartz veins and lenses (Toby Quartz) along a strike length of 1040 m (Schiller, 1965). Although a few higher gold assays were obtained, most samples assayed less than 2 g/t Au.

Most of the claims of the RUBY and TOBY block, extending 25 km along the Back River, were allowed to lapse in 1972. The D Zone area was restaked in 1974 as PENNY 1-12 by J. McMullin and J.L. Tinsdale and transferred in June 1975 to United Reef Petroleums Ltd. Ground adjoining the PENNY group to the north, south and west was restaked by Cominco in 1974 as part of the GAS, JAC, SY groups (Seaton, 1978). During 1974 and 1975 the PENNY claims were explored by geological mapping, EM and magnetic surveys (DIAND assessment reports 061313, 061438, 080255). The claims lapsed in 1981.

MATE 1, covering the ground previously held as the PENNY group, was recorded in September 1983. Silver Hart Mines tested the D Zone east of the Back River near the gossan, during 1983 by surface sampling and drilling ten

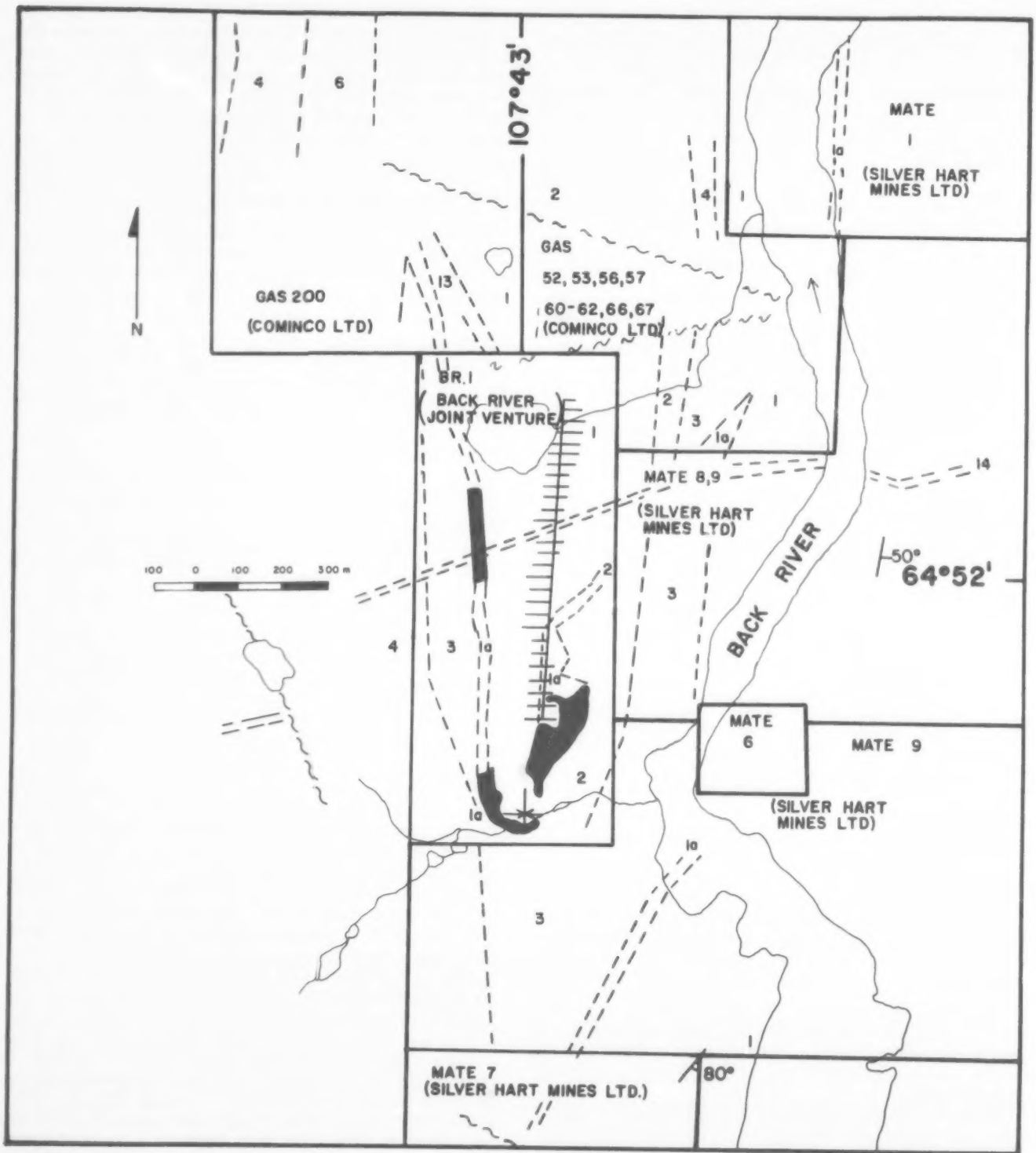
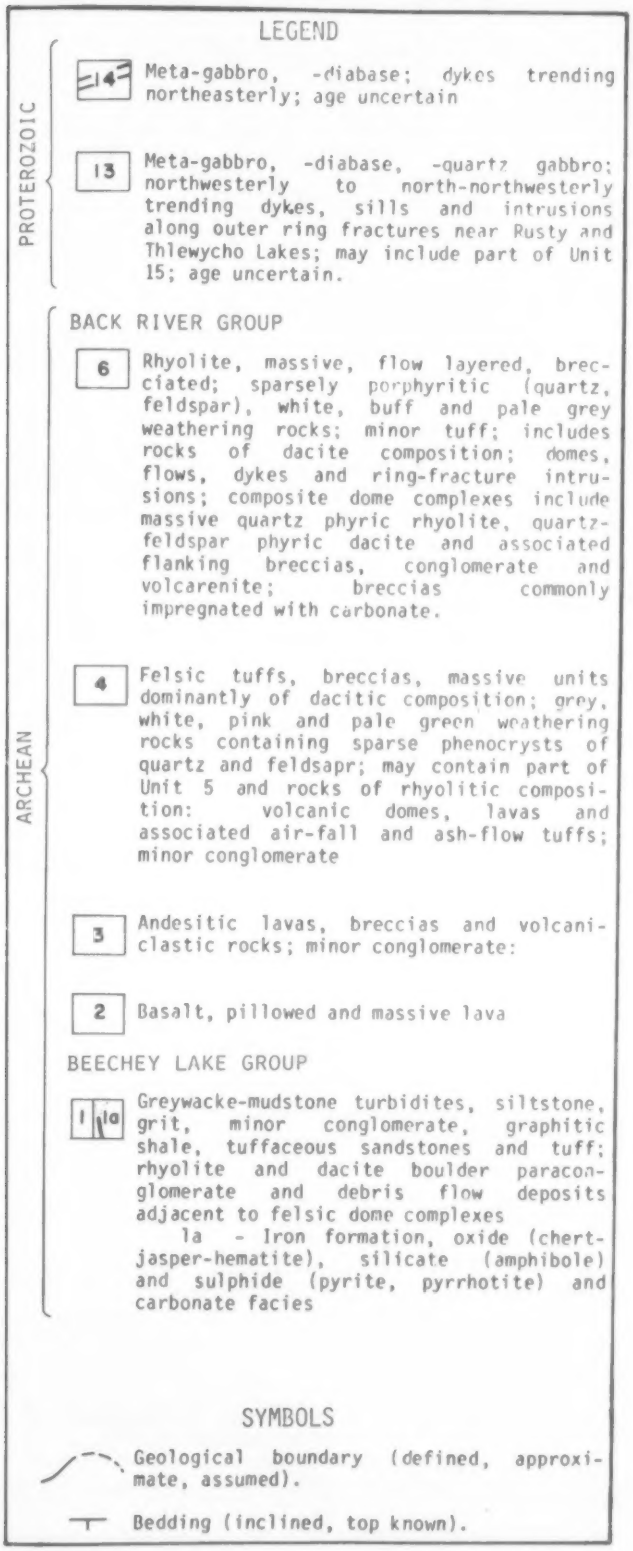



*FIGURE 8-8: Geology of the BR 1, GAS and MATE claims (geology simplified from Lambert, 1981).*


LEGEND
PROTEROZOIC
14
Meta-gabbro, -diabase; dykes trending northeasterly; age uncertain
13
Meta-gabbro, -diabase, -quartz gabbro; northwesterly to north-northwesterly trending dykes, sills and intrusions along outer ring fractures near Rusty and Thlewycho Lakes; may include part of Unit 15; age uncertain.
ARCHEAN
BACK RIVER GROUP
6
Rhyolite, massive, flow layered, brecciated; sparsely porphyritic (quartz, feldspar), white, buff and pale grey weathering rocks; minor tuff; includes rocks of dacite composition; domes, flows, dykes and ring-fracture intrusions; composite dome complexes include massive quartz phyric rhyolite, quartz-feldspar phyric dacite and associated flanking breccias, conglomerate and volcarenite; breccias commonly impregnated with carbonate.
4
Felsic tuffs, breccias, massive units dominantly of dacitic composition; grey, white, pink and pale green weathering rocks containing sparse phenocrysts of quartz and feldsapr; may contain part of Unit 5 and rocks of rhyolitic composition: volcanic domes, lavas and associated air-fall and ash-flow tuffs; minor conglomerate
3
Andesitic lavas, breccias and volcaniclastic rocks; minor conglomerate:
2
Basalt, pillowed and massive lava
BEECHEY LAKE GROUP
1
1a
Greywacke-mudstone turbidites, siltstone, grit, minor conglomerate, graphitic shale, tuffaceous sandstones and tuff; rhyolite and dacite boulder paraconglomerate and debris flow deposits adjacent to felsic dome complexes
1a - Iron formation, oxide (chert-jasper-hematite), silicate (amphibole) and sulphide (pyrite, pyrrhotite) and carbonate facies
SYMBOLS
Geological boundary (defined, approximate, assumed).
Bedding (inclined, top known).

holes, totalling 501 m (DIAND assessment report 081808). Main rock types intersected by the southern group of six drill holes were a porphyritic amphibole-rich rock containing amygdules and carbonate stringers and interpreted to be a dyke or flow, underlain or adjoined to the west by a quartz vein pyrite zone and a locally brecciated pyritic quartz-carbonate-chlorite schist unit. Four of these holes ended in basaltic flow top breccia; two penetrated shale or siltstone before entering the amphibole porphyry. The northern group of four holes, separated from the southern group by roughly 430 m, intersected shale that was commonly black, graphitic and pyritic. Other lithologies intersected by these four holes include amphibolitic and feldspathic dykes or flows.

As in the case of earlier drilling by Cominco, core samples gave generally low assays. All but 5 of 200 samples assayed less than 1 g/t Au. The best intersection was 16 g/t Au across 1.8 m of quartz-pyrite vein in a brecciated zone in Hole 83/10.

### DESCRIPTION

The property is at or near the western margin of the Back River Volcanic Complex (Lambert 1978, 1981). Although Lambert (1981) has mapped a northerly trending gossan-capped unit of iron formation (facies unspecified) as striking across MATE 1 on both sides of the Back River, drilling in 1983 did not intersect iron formation beneath the gossan east of the river. The gossan is easily explained by the high pyrite content of sections of a quartz-pyrite zone, which locally contains more than 50% pyrite across a few metres.

The quartz vein pyrite zone, intersected in the southern group of six holes, appears to obliquely cross-cut and contain brecciated inclusions of a quartz-carbonate-chlorite schist unit and, is thus, non-stratiform. The adjoining porphyritic amphibolitic unit is amygdaloidal. Iron formation has been reported on the BR claims 2 km to the south-southwest of the southwest group of holes, as well as at a similar distance to the north-northeast.

### CURRENT WORK AND RESULTS

In 1984, 2 holes totalling 112 m were drilled on MATE 1.

## GAS CLAIMS (Western Block)

Cominco Ltd.
700-409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 B/13
64°53'N, 107°42'W

### REFERENCES

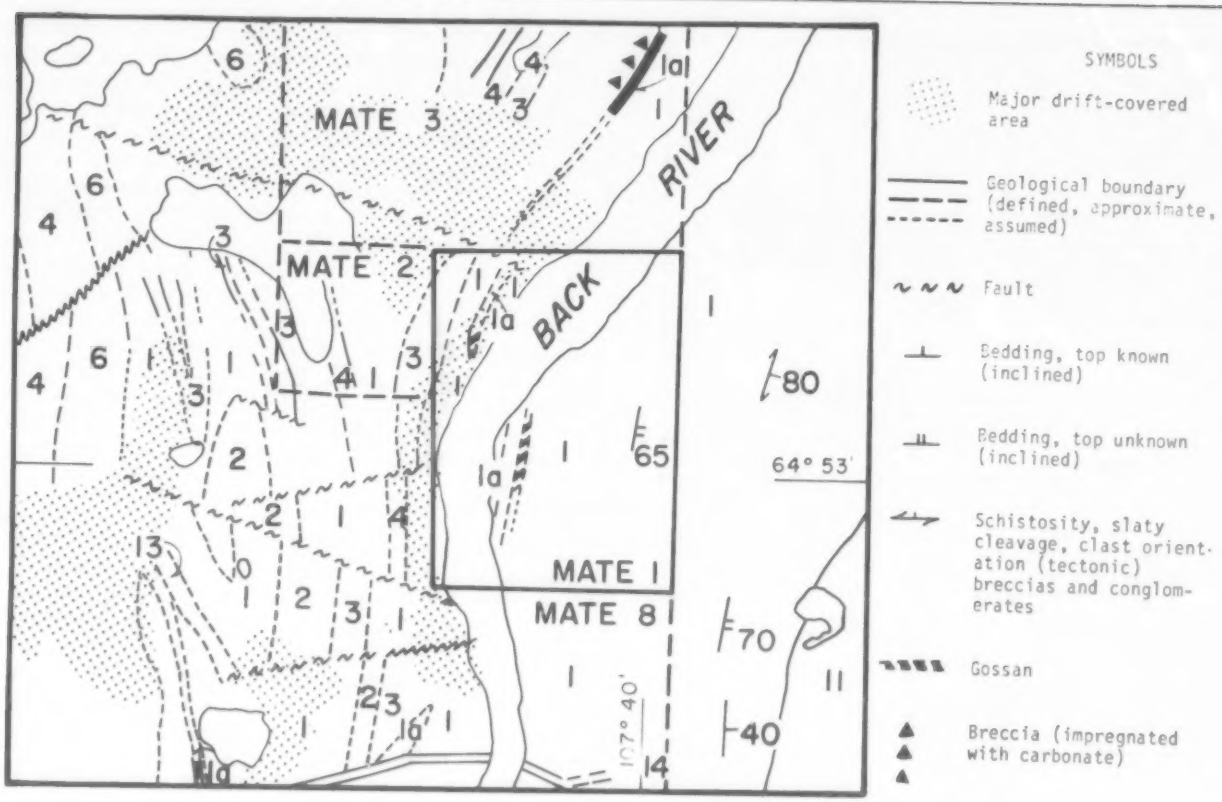
Lambert (1978, 1981): Schiller (1965); Schiller and Hornbrook (1964); Seaton (1978, 1984); Wright (1957, 1967).
DIAND assessment reports: 080292, 081367, 081854.

### PROPERTY

11 GAS claims.

### LOCATION

The claims are almost entirely on the west side of the Back River, 425 km northeasterly from Yellowknife (Fig. 8-10).




LEGEND

PROTEROZOIC

14 Meta-gabbro, -diabase; dykes trending northeasterly; age uncertain

REGAN INTRUSIVE SUITE

Biotite-hornblende diorite, -quartz diorite, -quartz monzodiorite; minor granite
11a - plagioclase bearing pyroxene hornblendite

ARCHEAN

YELLOWKNIFE SUPERGROUP

BACK RIVER GROUP

6 Rhyolite, massive, flow layered, brecciated; sparsely porphyritic (quartz, feldspar), white, buff and pale grey weathering rocks; minor tuff; includes rocks of dacite composition; domes, flows, dykes and ring-fracture intrusions; composite dome complexes include massive quartz phyric rhyolite, quartz-volcarenite; breccias commonly impregnated with carbonate

4 Felsic tuffs, breccias, massive units dominantly of dacitic composition; grey, white, pink and pale green weathering rocks containing sparse phenocrysts of quartz and feldspar; may contain part of Unit 5 and rock of rhyolitic composition: volcanic domes, lavas and associated air-fall and ash-flow tuffs; minor conglomerate

3 Andesitic lavas, breccias and volcaniclastic rocks; minor conglomerate

2 Basalt, pillowed and massive lava

BEECHEY LAKE GROUP

1 Greywacke-mudstone turbidites, siltstone, grit, minor conglomerate, graphitic shale, tuffaceous sandstones and tuff; rhyolite and dacite boulder paraconglomerate and debris flow deposits adjacent felsic dome complexes
1a - Iron formation, oxide (chert-jasper-hematite), silicate (amphibole) and sulphide (pyrite, pyrrhotite) and carbonate facies

*FIGURE 8-9: Geology of the MATE 1, 2, 3, 8 claims (geology simplified from Lambert, 1981).*

### HISTORY

Cominco staked GAS 1-133 in the fall of 1974 (Seaton, 1978).

In 1975, the claims were mapped at 1:5000 and several EM conductors, without magnetic correlation, were outlined in the southern part of the property.

By 1981, all but nine claims had lapsed. GAS 200 was recorded in August 1983 and GAS 201 in July 1984. Cominco owns other GAS claims in the Back River area, but they are not contiguous with the 11 GAS claims discussed in this section.

The exploration history of the property area has been reviewed by Schiller (1965), Schiller and Hornbrook (1964) and Seaton (1978, 1984).

### DESCRIPTION

The claims are underlain by rocks of the Back River Volcanic Complex (Lambert 1978, 1981), and are near the eastern margin of the complex.

### CURRENT WORK AND RESULTS

In 1984, three diamond drill holes, on GAS 52, 57 and 201 (Fig. 8-10), tested horizontal loop EM conductors.

## GAS CLAIMS (Eastern Block)

Cominco Ltd.
700-409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 B/13
64°53'N, 107°42'W

### REFERENCES

Lambert (1978, 1981); Wright (1957, 1967).
DIAND assessment report: 081901.

### PROPERTY

GAS 300, 400, 500, 600.

### LOCATION

The property is 430 km northeasterly from Yellowknife and, with the exception of small parts of GAS 300 and GAS 400, lies on or southeast of the Back River (Fig. 8-10).

### HISTORY

GAS 300 was recorded in October 1983, GAS 400 and GAS 500 in April 1984, and GAS 600 in September 1984. The area was prospected by Cominco in the sixties and auriferous iron formation was noted. Little or no further work was done until 1984.

### DESCRIPTION

The property is underlain by Yellowknife Supergroup metasediments which are intruded by granodiorite. The metasediments flank the eastern margin of the Back River Volcanic Complex (Lambert, 1978). Iron formation units within the metasediments are locally auriferous.

### CURRENT WORK AND RESULTS

In 1984, reconnaissance mapping and sampling delineated units of locally auriferous iron formation. Encouraging gold assays prompted the staking of GAS 400, 500 and 600. In 1985, geological mapping (1:5000 scale) and magnetic and VLF-EM surveys were completed over a grid on GAS 400, 500 and 600 (Fig. 8-10).

## MATE 4 CLAIM

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Silver, Zinc, Lead
76 B/13
64°55'N, 107°47'W

### REFERENCES

Lambert (1978, 1981).
DIAND assessment report: 081930.

### PROPERTY

MATE 4.

### LOCATION

MATE 4 is 425 km northeasterly from Yellowknife and 15 km south of the southern shore of Regan Lake.

### HISTORY

MATE 4 was recorded in April 1983 for Silver Hart Mines Ltd.

### DESCRIPTION

MATE 4 is on the northern margin of the Back River Volcanic Complex (Lambert, 1978, 1981). It is underlain by rhyolite-dacite of the Back River Group and greywacke-mudstone turbidites of the Beechey Lake Group.

### CURRENT WORK AND RESULTS

In 1984, one hole was drilled in the south-central part of the claim. The hole intersected 66 m of rhyolite and, lower in the hole, 26 m of feldspar porphyry with a small amount of quartz.

Rhyolite core samples assayed up to 4.2 g/t Au across 1.5 m, but most assayed less than 2 g/t Au. Feldspar porphyry samples assayed up to 28.6 g/t Ag, with 336 ppm Zn and 56 ppm Pb. The higher assays were associated with disseminated pyrite (up to 1%), with occasional pyrite veinlets and minor carbonate veinlets.

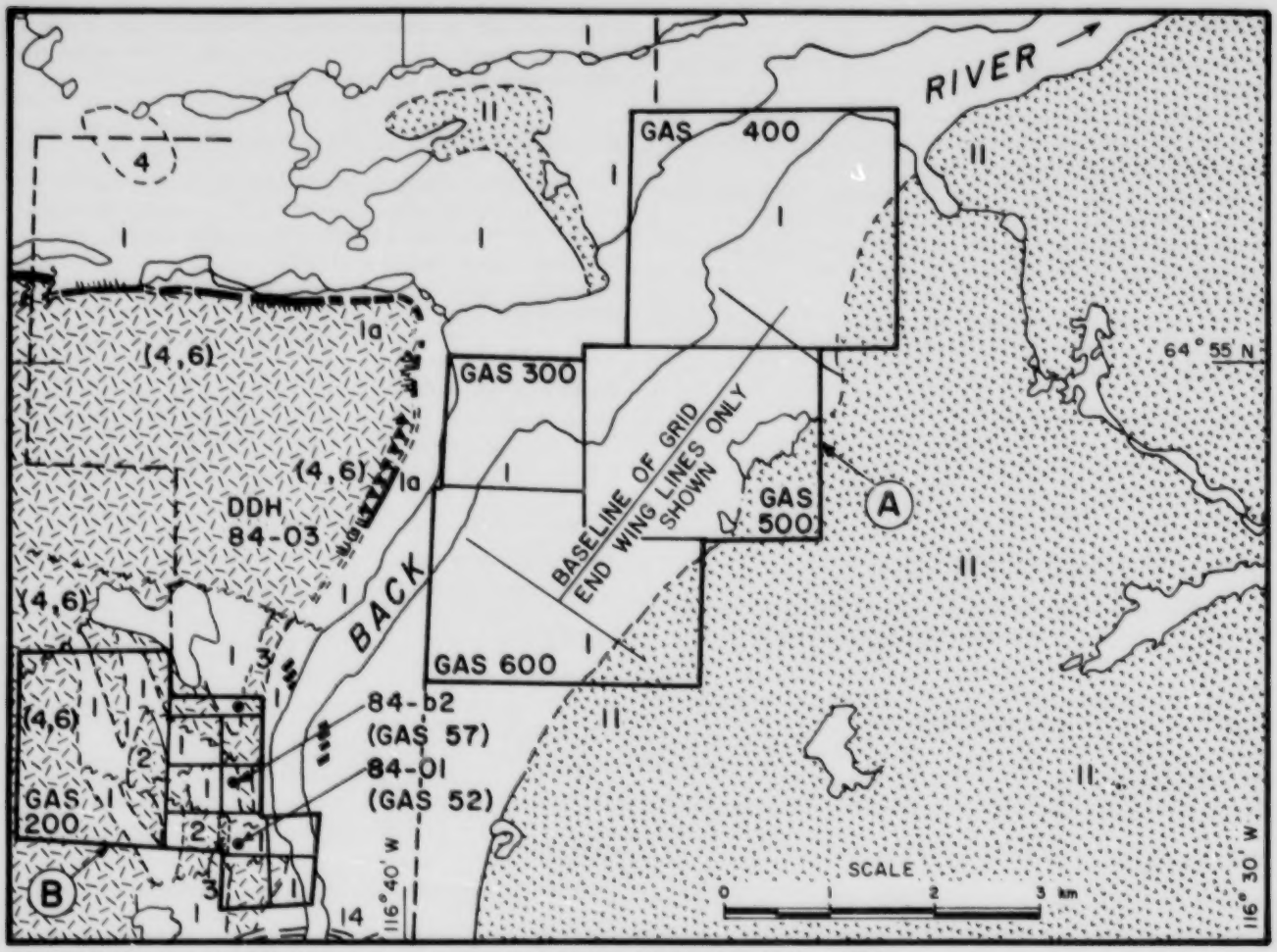



*FIGURE 8-10: Geology of the GAS claims; eastern and western blocks (geology simplified from Lambert, 1981).*

## MATE 5, 10

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Gold
76 B/13
64°55'N, 107°55'W

### REFERENCES

Lambert (1978, 1981).
DIAND assessment report: 081932.

### PROPERTY

MATE 5, 10.

### LOCATION

The claims are roughly 435 km northeasterly from Yellowknife and largely northwest of the Back River. MATE 5 extends 4 km west of the Back River. MATE 10 adjoins the northern and eastern margins of MATE 5 and extends 2 km west of the Back River.

### DESCRIPTION

According to Lambert (1981), the claim area is underlain by Beechey Lake group metasediments, except for a small part southeast of the Back River, which is underlain by part of a pluton of the Regan Intrusive Suite.

### CURRENT WORK AND RESULTS

Four holes were diamond drilled in 1984 within an area of a 500 m radius of 64°57'N, 107°32'W; one on MATE 5 and three on MATE 10.

The holes were intended to probe the source of auriferous arsenopyrite-bearing quartz veins and stringers in quartz diorite found in frost-heaved boulders nearby. Quartz-veined diorite was not intersected and core was not assayed.

The holes intersected Beechey Lake Group metasediments and feldspar to feldspar-biotite-quartz porphyry. A diorite sill was intersected across 4.6 m in one hole.

PROTEROZOIC

14 Meta-gabbro, -diabase, dykes trending northeasterly, age uncertain

ARCHEAN

REGAN INTRUSIVE SUITE

Ir Biotite-hornblende diorite,-quartz diorite, -quartz monzodiorite; minor granite

YELLOWKNIFE SUPERGROUP

BACK RIVER GROUP

6 Rhyolite, massive, flow layered, brecciated; sparsely porphyritic (quartz, feldspar), white, buff and grey weathering rocks; minor tuff; includes rocks of dacite composition; domes, flows, dykes and ring-fracture intrusions; composite dome complexes includemassive quartz phyric rhyolite, quartz-feldspar phyric dacite and associated flanking breccias, conglomerate and volcarenite; breccias commonly impregnated with carbonate

4/6 Units 4 and 6 undivided

4 Felsic tuffs, breccias, massive units dominantly of dacitic composition; grey, white, pink and pale green weathering rocks containing sparse phenocrysts of quartz and feldspar; may contain rocks of rhyolitic composition; volcanic domes, lavas and associated air-fall and ash-flow tuffs; minor conglomerate

3 Andesitic lavas, breccias and volcaniclastic rocks; minor conglomerate

2 Basalt, pillowed and massive lava

BEECHEY LAKE GROUP

1 10 Greywacke-mudstone turbidites, siltstone, grit, minor conglomerate, graphitic shale, tuffaceous sandstones and tuff; rhyolite and dacite boulder paraconglomerate and debris flow deposits adjacent felsic dome complexes

1a: - Iron formation, oxide (chert-jasper-hematite), silicate (amphibole) and sulphide (pyrite, pyrrhotite) and carbonate facies

These sediments range in metamorphic grade from lower greenschist facies along the eastern and northern sides of the volcanic complex, increasing to amphibolite facies bearing staurolite, cordierite and andalusite near Jim Magrum Lake

Gossan

Breccia (impregnated with carbonate)

Rocks impregnated with carbonate

GAS claims: (A) Eastern block

(B) Western block

# DOC, PERU, PU, SIDD AND UL CLAIMS

Noranda Expl. Company Ltd.
4-2130 Notre Dame Ave.,
Winnipeg, Man., R3H 0K1

Gold
76 B/13; 76 G/3,4; 76 F/8
64°59'-65°18'N,
107°22'-108°15'W

## REFERENCES

Frith (1981a); Frith and Percival (1978); Lambert (1978, 1981); Lord (1951); Seaton and Crux(1985).

DIAND assessment reports: 081610, 081789, 081909.

## PROPERTY

DOC 1; PERU 1-7; PU 1,2; 19 SIDD claims; UL 1-11.

## LOCATION

The claims are 430 to 445 km northeasterly from Yellowknife and extend from the vicinity of Uist Lake to the Back River in a southeasterly direction. They comprise five discrete claim blocks (Fig. 8-11).

## HISTORY

Gold was discovered in the area in the mid-forties when the ALGOOD claim group was staked near Regan Lake (Lord, 1951). Additional references to the exploration history are given in Seaton and Crux (1985).

From 1974 to 1980, Noranda Exploration Company Ltd. explored for massive volcanogenic sulphide silver-base metal deposits in the Hackett River Volcanic Belt. In 1981, Noranda was granted Prospecting Permits 811-813 (Seaton and Crux, 1985; DIAND assessment report 081610), which covered 76 G/4 NW, and 76 G/5 SE and SW.

In 1982, during prospecting and reconnaissance geological mapping of Prospecting Permit 811, a zone of auriferous, arsenopyrite-bearing oxide and silicate facies iron formation was discovered between the Algood and Ack showings (Fig. 8-11). SIDD 1-10 (recorded in November 1982) were staked to cover the zone.

In 1983, geological and geophysical surveys and rock sampling resulted in delineation of additional auriferous iron formation, and staking of 37 more claims; 14 of which were staked to cover a zone of iron formation near the northwestern shore of Uist Lake.

Of the claims in good standing in 1984, SIDD 1-10 were recorded in November 1982, SIDD 20-22, 29-34, PERU 1-7 and DOC 1 in August 1983, UL 1-11 in November 1983, and PU 1,2 in August 1984.

During 1984, Noranda held the DOC, PERU, SIDD and UL claims and acted as operator on behalf of the Hackett/Back Joint Venture in which Noranda Exploration Company Ltd., Pez Corona Gold Corporation Ltd. and Ventorex Exploration Ltd. are partners. The Hackett/Back Joint Venture also explored their FT and HR claims during 1984 (Fig. 8-11 and p. 184 of this report).

## DESCRIPTION

Geological Survey of Canada open file maps at 1:50,000 (Lambert, 1981) and 1:125,000 (Frith, 1981a) are available for the area.

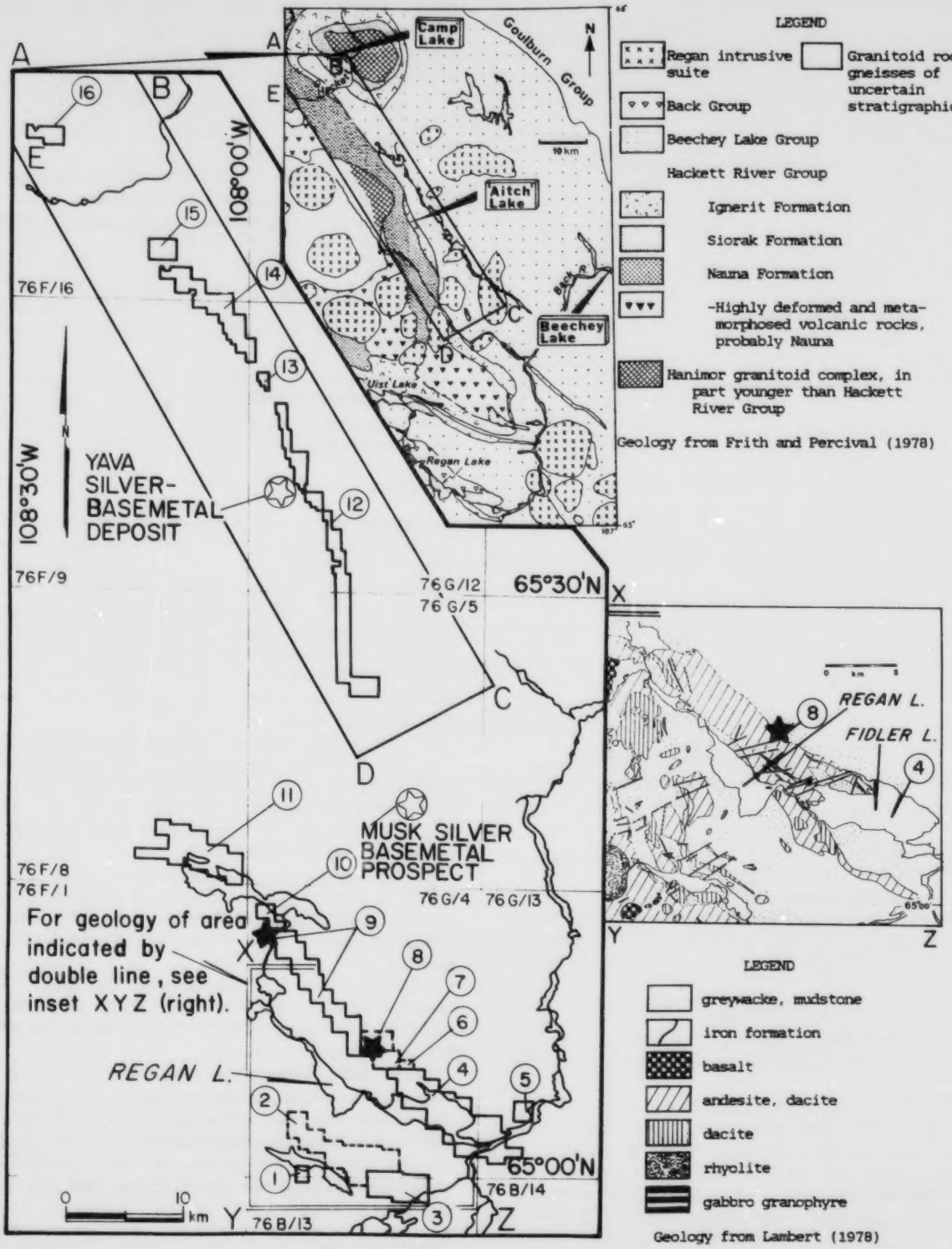



*FIGURE 8-11: SIDD, PERU, UL, FT and HR claims. (a) Claim blocks and geology. (b) Grids, Algood and Ack showings and claim block outlines.*

CLAIM BLOCKS (1) TO (16) OPPOSITE PAGE

(1) DOC 1

(2) SIDD 12-20 (no reported 1984-1985 work)

(3) SIDD 20-22

(4) PERU 1-4, SIDD 29-32,34 (PERU claims are on S.W. side of block)

(5) SIDD 33

(6) RL 1 (Trigg, Woollett, Olson Consulting, for Back River Joint Venture)

(7) SIDD 11 (not reported)

(8) ALGOOD 1,2 (Giant Yellowknife Mines Ltd.)
☆ Algood gold showing (discovered 1946, first drilled 1948)

(9) SIDD 1-10 (numbers increase northwesterly)
☆ Ack gold showing (drilled by Falconbridge Nickel Mines Ltd. in 1964)

(10) PU 1,2

(11) UL 1-11

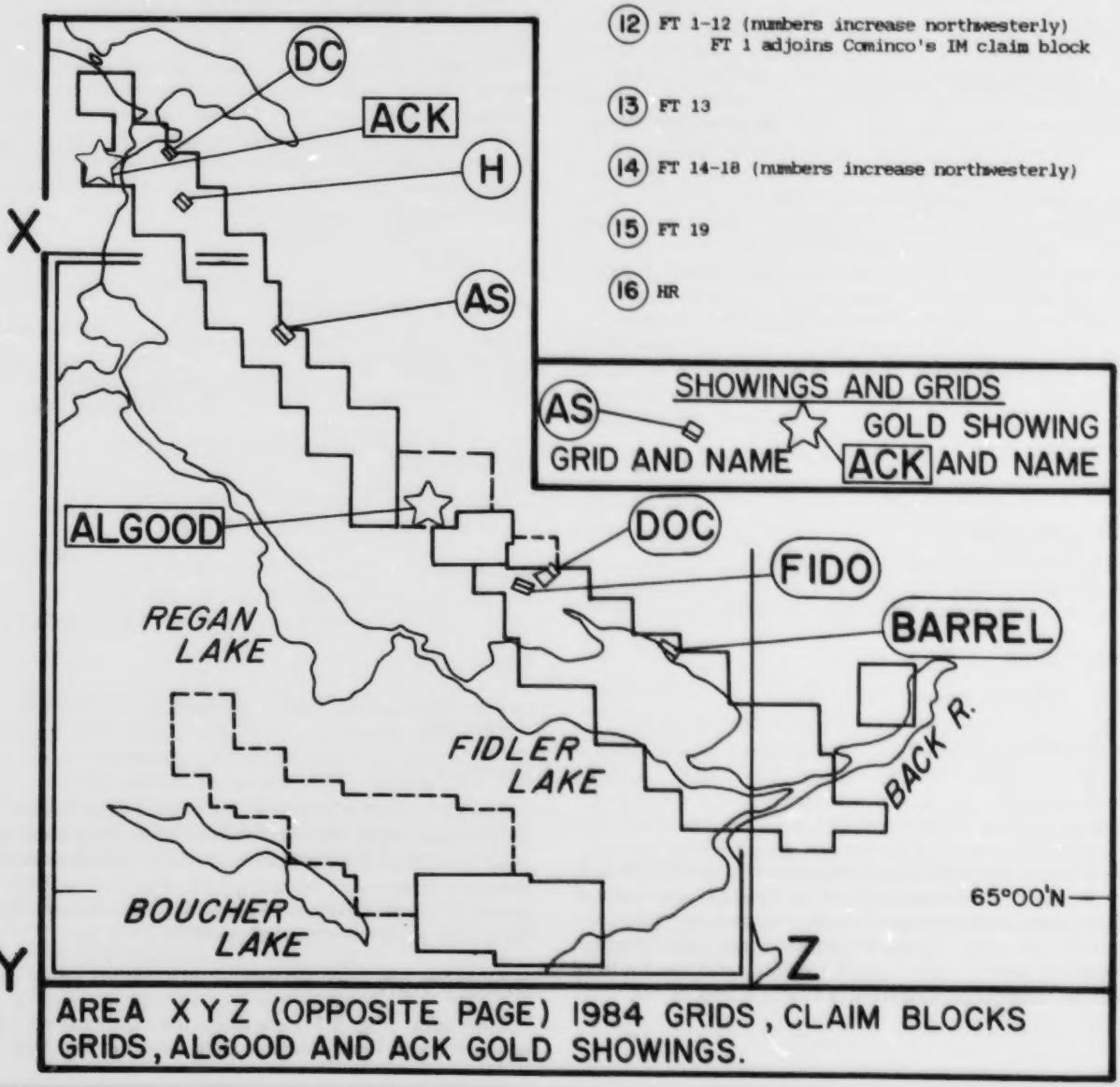
(12) FT 1-12 (numbers increase northwesterly)
FT 1 adjoins Cominco's IM claim block

(13) FT 13

(14) FT 14-18 (numbers increase northwesterly)

(15) FT 19

(16) HR




AREA XYZ (OPPOSITE PAGE) 1984 GRIDS, CLAIM BLOCKS GRIDS, ALGOOD AND ACK GOLD SHOWINGS.

The DOC, PERU and SIDD claims are underlain by andesitic to dacitic volcanics of the Back River Volcanic Complex and Beechey Lake Group metasediments periferal to the volcanics. In the Regan Lake-Fidler Lake area, a tongue of volcanics extends southeasterly from the north end of the Back River Volcanic Complex, and is flanked to the northeast and southwest by Beechey Lake Group metasediments. The metasediments contain lenses and zones of iron formation which is locally auriferous.

The PU and UL claims are underlain by Hackett River Group volcanics of the Ignerit Formation or Beechey Lake Group metasediments marginal to the metavolcanics, which, here also, contain zones of iron formation. On the UL claims, a narrow belt of mafic volcanics is separated from the main body of the Hackett River Group volcanics by a thin layer of graphitic and pyritic metasediments.

### CURRENT WORK AND RESULTS

In 1984, geological reconnaissance mapping of the claims led to construction of grids on six target areas (Fig. 8-11). The grids were explored by 1:2,500 geological mapping, magnetic and VLF-EM surveys.

The highest gold assays came from samples taken on the Doc, Fido and H grids. Magnetic anomalies were recorded on all grids but the H and Barrel grids, and VLF-EM conductors were delineated on all but the H grid.

In the DOC 1 and SIDD 20-22 area iron formation is mainly oxide facies, and in the Uist Lake to Fidler Lake area, of silicate and sulphide facies. Gold is generally associated with arsenopyrite, commonly coarse grained, and is concentrated in altered chemical sediments enveloping iron formation and not in the iron formation itself. Gold was found both in the altered chemical sediments and in sulphide-bearing quartz veins cross-cutting such sediments. Less commonly, gold was found in quartz veins cutting unaltered argillite and greywacke.

## ALB 1 CLAIM

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Gold
76 B/13, 76 G/4
65°00'30"N, 107°32'W

### REFERENCES

Frith (1981a); Lambert (1978, 1981).

### PROPERTY

ALB 1.

### LOCATION

ALB 1 is mainly in the southeastern corner of NTS 76 G/4; only the southern margin is in NTS 76 B/13. The claim is 440 km northeasterly from Yellowknife and roughly 1 km south of Fidler Lake. The Back River flows northward through the eastern part of ALB 1. ALB 1 adjoins and lies south of Noranda Exploration Company's PERU 4 (Fig. 8-11).

### HISTORY

ALB 1 was recorded for Silver Hart Mines Ltd. in September 1983.

### DESCRIPTION

ALB 1, according to Frith (1981), is largely underlain by greywacke of the Beechey Lake Group. Volcanics of the Back River Group underlie the northwestern corner of the claim. The volcanics are described as massive and pillowed andesite, porphyritic andesite and andesitic tuff.

### CURRENT WORK AND RESULTS

A total of 185 m, in two holes, was drilled on ALB 1 in 1984. The presumed target was auriferous iron formation. Results of this drilling have not been reported.

## BEECHEY LAKE BASIN

The term "Beechey Lake Basin" is used in this report to denote the large area of deposition of metasedimentary rocks centred at Beechey Lake. Metamorphic grade increases northwesterly and southeasterly towards the Thelon Front, away from the northwestern end of Beechey Lake. The Beechey Lake Basin adjoins the Hackett River Volcanic Belt (Frith, 1981a,b).

## FT AND HR CLAIMS

Noranda Expl. Company Ltd.
4-2130 Notre Dame Ave.
Winnipeg, Man., R3H 0K1

Gold
76 F/16; 76 G/5,12
65°24'-65°48'N,
107°44'-108°07'W

### REFERENCES

Frith (1981a); Frith and Percival (1978).
DIAND assessment report: 081909.

### PROPERTY

FT 1-19; HR 1.

### LOCATION

The claims are roughly 475 km northeasterly from Yellowknife.

### HISTORY

The FT and HR claims were recorded in November 1983, by Noranda Exploration Company. They were explored in 1984 as part of the Hackett/Back Joint Venture, in which Noranda Exploration Company Ltd., Pez Corona Gold Corporation Ltd. and Ventorex Exploration Ltd. are partners and for which Noranda acted as operator.

### DESCRIPTION

The claims (Fig. 8-11) are along the northeastern margin of the Hackett River Volcanic Belt, which in this area com-

prises rocks of the Nauna and Ignerit Formations (Fig. 8-11; Frith, 1981a; Frith and Percival, 1978). The volcanics are flanked to the northeast by argillites and greywackes of the Beechey Lake Group. Within the Beechey Lake Group, near its contact with the Hackett River Volcanic Belt, are several thin units of chert-amphibole-magnetite iron formation.

### CURRENT WORK AND RESULTS

A gossan that discontinously follows the margin of the Hackett River Volcanic Belt was prospected. The gossan caps pyritic chlorite schists and iron-bearing carbonate rock in felsic volcanics near their contact with metasediments of the Beechey Lake Group. Grab samples from the gossan assayed less than 3.5 g/t Au, as did grab samples of the Beechey Lake Group iron formations.

In addition to magnetite and chert beds, actinolite-tremolite amphiboles were found in layers between magnetite. Magnetite layers contain laths and radiating aggregates of grunerite. Arsenopyrite is rare but disseminated pyrite is found in the chert bands of the iron formation and in associated chlorite schists (DIAND assessment report 081909).

## PROSPECTING PERMITS 1042, 1043

Back River Joint Venture
c/o Trigg, Woollett, Olson
Consulting Ltd.
10504-103 St.
Edmonton, Alta., T5H 2V4

Gold
76 G/3
65°00'-65°15'N
107°00'- 107°30'W

### REFERENCES

Frith (1981a,b); Gibbins and others (1977); Seaton (1978).

DIAND assessment reports: 061343, 061344, 061392, 081975.

### PROPERTY

Prospecting Permits 1042, 1043.

### LOCATION

The permits lie 460 km northeasterly from Yellowknife. Permit 1043 is 1 km west of Casey Lake.

### HISTORY

Du Pont of Canada Exploration Ltd., in 1974-75, explored NTS quadrants 76 G/2 and 76 G/3 as Prospecting Permits 328 and 329 respectively (DIAND assessment reports 061343, 061344, 061392; Gibbins and others, 1977; Seaton, 1978). Du Pont's main target was argentiferous base metal, volcanogenic, massive sulphides, but in the course of exploration, a gold showing was discovered (see BEE 1-3 claim, page of this report).

In 1983, Trigg, Woollett, Olson Consulting, as operators for Back River Joint Venture, prospected and rock sampled parts of 76 G/3 NW and SE.

MR 1 was recorded in September 1984 and Prospecting Permits 1042, 1043 were granted on February 1, 1985.

### DESCRIPTION

The regional geology of the area has been mapped and compiled by Frith, 1981a,b.

Much of the permit area is underlain by Beechey Lake Group metasediments and granitoids (Fig. 8-12). A small part of Prospecting Permit 1042 is underlain by volcanics of the Hackett River Group and, a yet smaller part, by a narrow belt of Back Group volcanics.

Cominco's Prospecting Permits 1053-1055 adjoin Prospecting Permits 1042 and 1043.

### CURRENT WORK AND RESULTS

In 1984, Prospecting Permits 1042 and 1043 were explored by reconnaissance prospecting, rock sampling and geological mapping at 1:10,000 scale. MR 1 was staked in 1984.

In 1985, exploration was confined to Prospecting Permit 1043 and comprised prospecting, rock sampling and geological mapping at 1:10,000.

## BEE CLAIMS AND PROSPECTING PERMITS 1053, 1054, 1055

Cominco Ltd.
700, 409 Granville St.
Vancouver, B.C.,
V6C 1T2

Gold
76 G/3,6
65°15'N, 107°15'W

### REFERENCES

Allen, Cameron and Durham (1972); Frith (1981a,b); Gibbins and others (1977); Seaton (1978); Tremblay (1971).

DIAND assessment reports: 061343, 081937, 081969.

### PROPERTY

BEE 1-3; Prospecting Permits 1053, 1054, 1055.

### LOCATION

The permit area is roughly 470 km northeasterly from Yellowknife. Prospecting Permit 1054 (76 G/6 SW) straddles the Back River. Permit 1053 (76 G/6 SE) lies directly north of Prospecting Permit 1055 (76 G/3 NE), which encloses BEE 1-3.

### HISTORY

Du Pont of Canada Exploration Ltd. explored NTS 76 G/3 as Prospecting Permit 329, in 1974 (Gibbins and others, 1977; Seaton, 1978; and DIAND assessment report 081343). The target was mainly silver-base metal volcanogenic massive sulphides and the work was prompted in part by the delineation of geochemical anomalies by Allen, Cameron and Durham (1972). Du Pont discovered a gold showing in sericitic schist, now covered by the BEE claims.

BEE 1-3 were recorded in August 1985. Prospecting Permits 1053 to 1055 were granted in 1985.

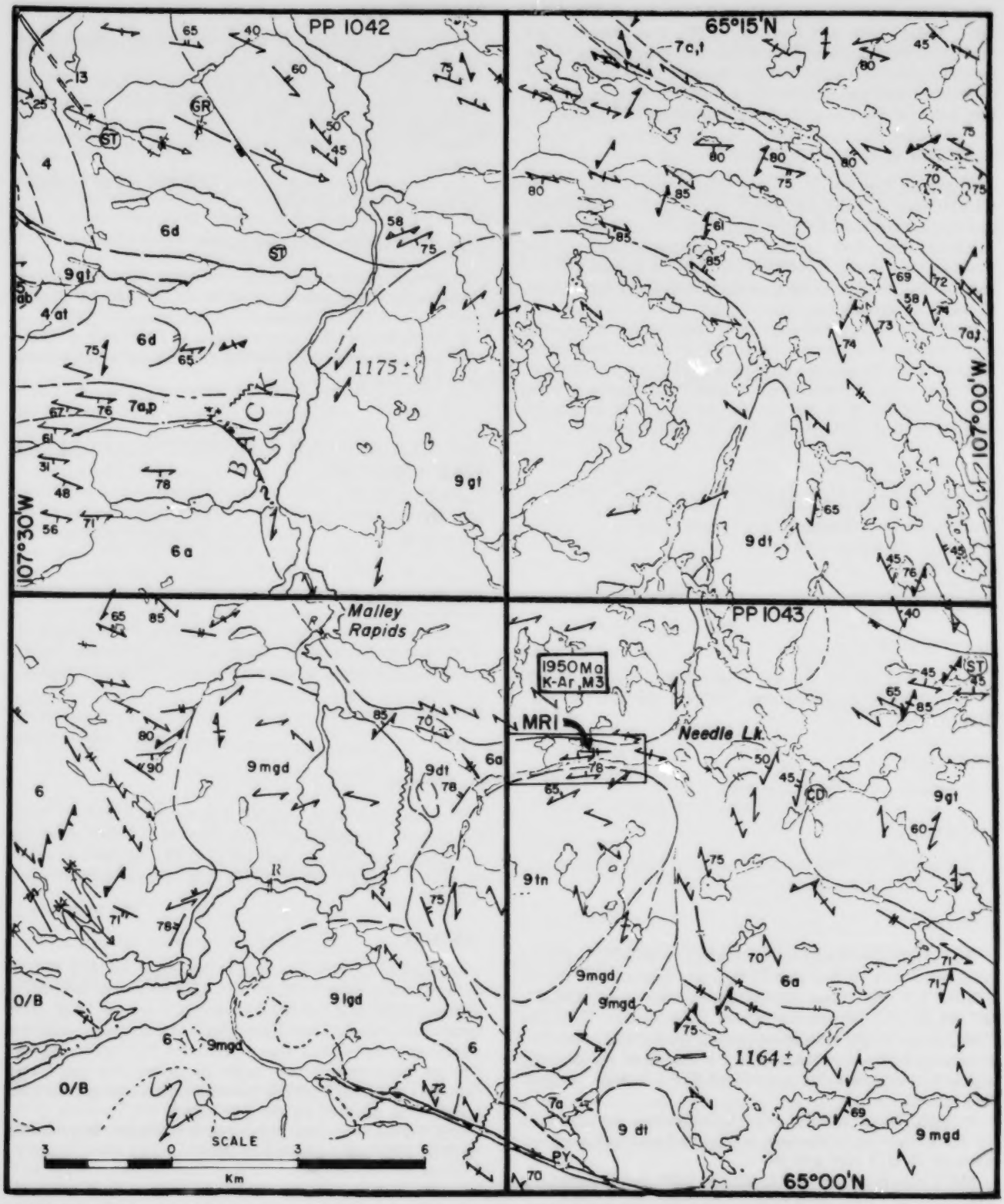
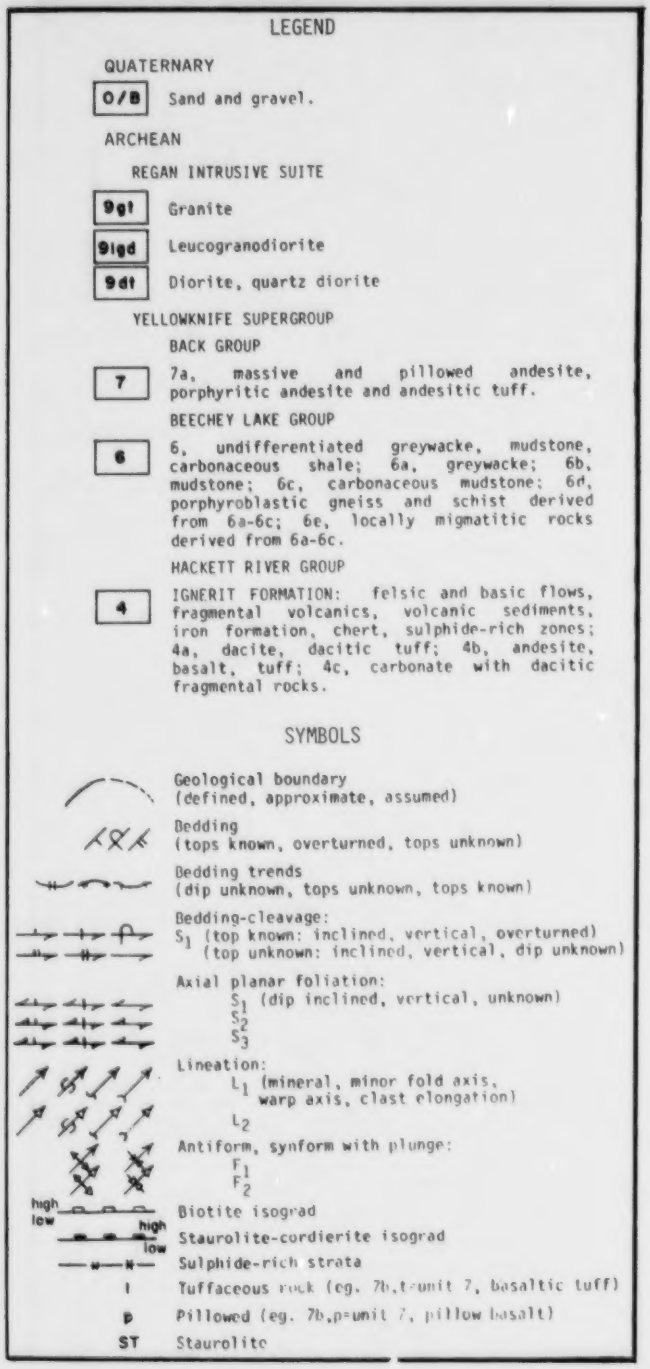



*FIGURE 8-12: Geology of the Prospecting Permits 1042 and 1043 (geology from Frith, 1981a).*


LEGEND
QUATERNARY
O/B Sand and gravel.
ARCHEAN
REGAN INTRUSIVE SUITE
9gt Granite
9lgd Leucogranodiorite
9dt Diorite, quartz diorite
YELLOWKNIFE SUPERGROUP
BACK GROUP
7 7a, massive and pillowed andesite, porphyritic andesite and andesitic tuff.
BEECHEY LAKE GROUP
6 6, undifferentiated greywacke, mudstone, carbonaceous shale; 6a, greywacke; 6b, mudstone; 6c, carbonaceous mudstone; 6d, porphyroblastic gneiss and schist derived from 6a-6c; 6e, locally migmatitic rocks derived from 6a-6c.
HACKETT RIVER GROUP
4 IGNERIT FORMATION: felsic and basic flows, fragmental volcanics, volcanic sediments, iron formation, chert, sulphide-rich zones; 4a, dacite, dacitic tuff; 4b, andesite, basalt, tuff; 4c, carbonate with dacitic fragmental rocks.
SYMBOLS
Geological boundary (defined, approximate, assumed)
Bedding (tops known, overturned, tops unknown)
Bedding trends (dip unknown, tops unknown, tops known)
Bedding-cleavage: S1 (top known: inclined, vertical, overturned) (top unknown: inclined, vertical, dip unknown)
Axial planar foliation: S1 (dip inclined, vertical, unknown) S2 S3
Lineation: L1 (mineral, minor fold axis, warp axis, clast elongation) L2
Antiform, synform with plunge: F1 F2
high low Biotite isograd
high low Staurolite-cordierite isograd
Sulphide-rich strata
t Tuffaceous rock (eg. 7b,t=unit 7, basaltic tuff)
p Pillowed (eg. 7b,p=unit 7, pillow basalt)
ST Staurolite

## DESCRIPTION

The regional geology was compiled by Frith (1981a,b). The prospecting permits are mainly underlain by Archean Beechey Lake Group metasediments; greywacke-mudstone turbidites and their metamorphic derivatives (Fig. 8-13). A unit of mafic flows and tuffs, in part carbonate-rich, strikes northwesterly through Prospecting Permit 1055 and BEE 1-3, the southwestern corner of Prospecting Permit 1053 and Permit 1054. Felsic volcanics of the Ignerit Formation underlie the southwestern corner of Prospecting Permit 1054. These felsic volcanics are rimmed by a thin, roughly 100 m thick unit of limestone, which is in contact to the east with Beechey Lake Group metasediments.

Granite underlies the southwestern third of Prospecting Permit 1055 and a 3 km wide stock of leucogranodiorite underlies part of the southeastern quarter of Permit 1053.

Most of the permit area is underlain by metamorphic facies between the biotite isograd and the staurolite-cordierite isograd. Rocks in the northeastern corner of Permit 1053 are on the low grade side of the biotite isograd and porphyroblastic gneisses and schists in the western part of Permit 1054 are on the high grade side of the staurolite-cordierite isograd.

## CURRENT WORK AND RESULTS

In 1985, the prospecting permits and BEE claims were mapped. A 4000 by 1000 m grid was constructed on BEE 1. The grid was explored by detailed geological mapping, rock sampling and magnetic and VLF-EM surveys. Rock samples from the three permits and from the BEE 1 grid were analyzed for gold. Four trenches were excavated and sampled for gold, one at the eastern end of the grid and three roughly 1300 m west-northwesterly from trench 1.

# IM CLAIMS

Cominco Ltd.
700-409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 G/5
65°23'N, 107°41'W

## REFERENCES

Frith (1981a); Seaton (1978).
DIAND assessment reports: 080451, 080576, 081970.

## PROPERTY

IM 1-3,6-8.

## LOCATION

The claims are 460 km northeasterly from Yellowknife and 28 km southeasterly from the Yava massive sulphide deposit.

## HISTORY

IM 1-3 and 6-8 were recorded for Cominco Ltd.; IM 1 in July 1984 and IM 2-3 and 6-8 in October 1985. They cover part of ground staked in 1974 for Precambrian Mining Services Ltd. as IM 1-38. This was acquired in 1975 by the Yava Syndicate which comprised Brascan Resources Ltd., Conwest Exploration Ltd. and S. Roscoe. The main target of the Yava Syndicate was volcanogenic silver-base metal deposits, but in the course of exploration (DIAND assessment reports 080451, 080576 and Seaton, 1978) they discovered auriferous iron formation showings south of Triangle Lake (Fig. 8-14). Two trenches were excavated to explore this gold showing.

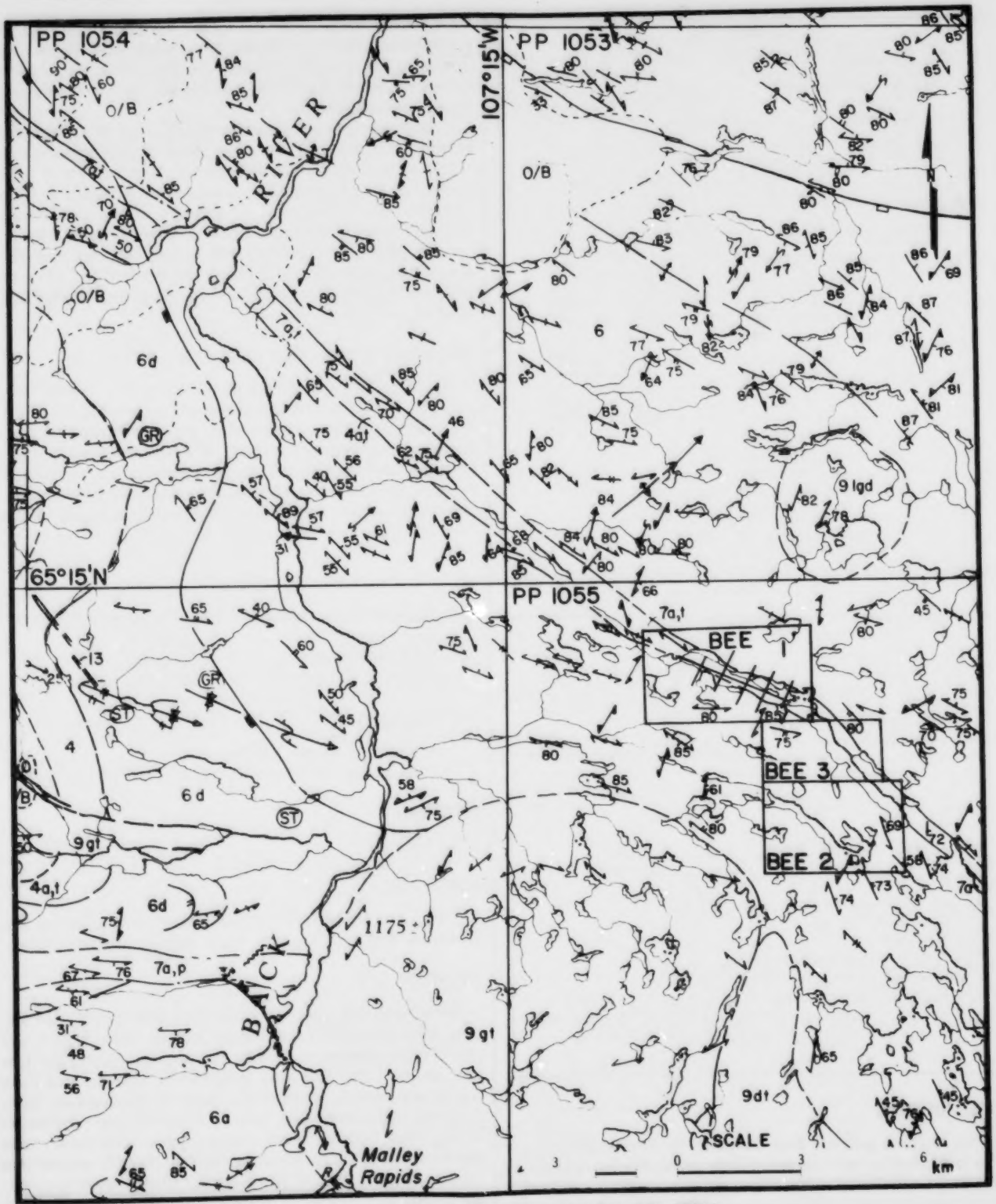



*FIGURE 8-13: Geology of the BEE claims and Prospecting Permits 1053-1055 (geology from Frith, 1981a).*

LEGEND

QUATERNARY

O/B Glacial till. Sand, gravel

HELIKIAN

13 Mackenzie diabase dykes

ARCHEAN

REGAN INTRUSIVE SUITE

9gt Granite

9lgd Leucogranodiorite

9mgd Melanogranodiorite

9gd Granodiorite, undifferentiated

9tn Tonalite

9dt Diorite, quartz diorite

YELLOWKNIFE SUPERGROUP

BACK GROUP

7 7a, massive and pillowed andesite, porphyritic andesite and andesetic tuff

BEECHEY LAKE GROUP

6 6, undifferentiated greywacke, mudstone, carbonaceous shale; 6a, greywacke; 6b, mudstone; 6c, carbonaceous mudstone; 6d, porphyroblastic gneiss and schist derived from 6a-6c; 6e, locally derived migmatitic rocks derived from 6a-6c

HACKETT RIVER GROUP

5 Metamorphosed and deformed equivalents of unit 3 (Nauna Formation volcanics) and unit 4; 5a, dacite; 5b, andesite and/or basalt

4 IGNERIT FORMATION: felsic and mafic flows, fragmental volcanics, volcanic sediments, iron formation, chert, sulphide-rich zones; 4a, dacite, dacitic tuff

SYMBOLS

Geological boundary (defined, approximate, assumed)

Bedding (tops known, overturned, unknown)

Bedding trends (dips unknown, tops unknown; tops known)

Bedding - cleavage: $S_1$ (top known: inclined, vertical, overturned) (top unknown: inclined, vertical, dip unknown)

$S_1$ Axial planar foliation $S_2$ (dip inclined, vertical, $S_3$ unknown)

Lineation - L] (mineral, minor fold axis, warp axis, clast elongation)

Fault (defined, approximate)

HIGH / LOW Staurolite-cordierite isograd

Sulphide-rich strata

GR Garnet

ST Staurolite

t Tuffaceous (eg. 7b,t = unit 7, basaltic tuff)

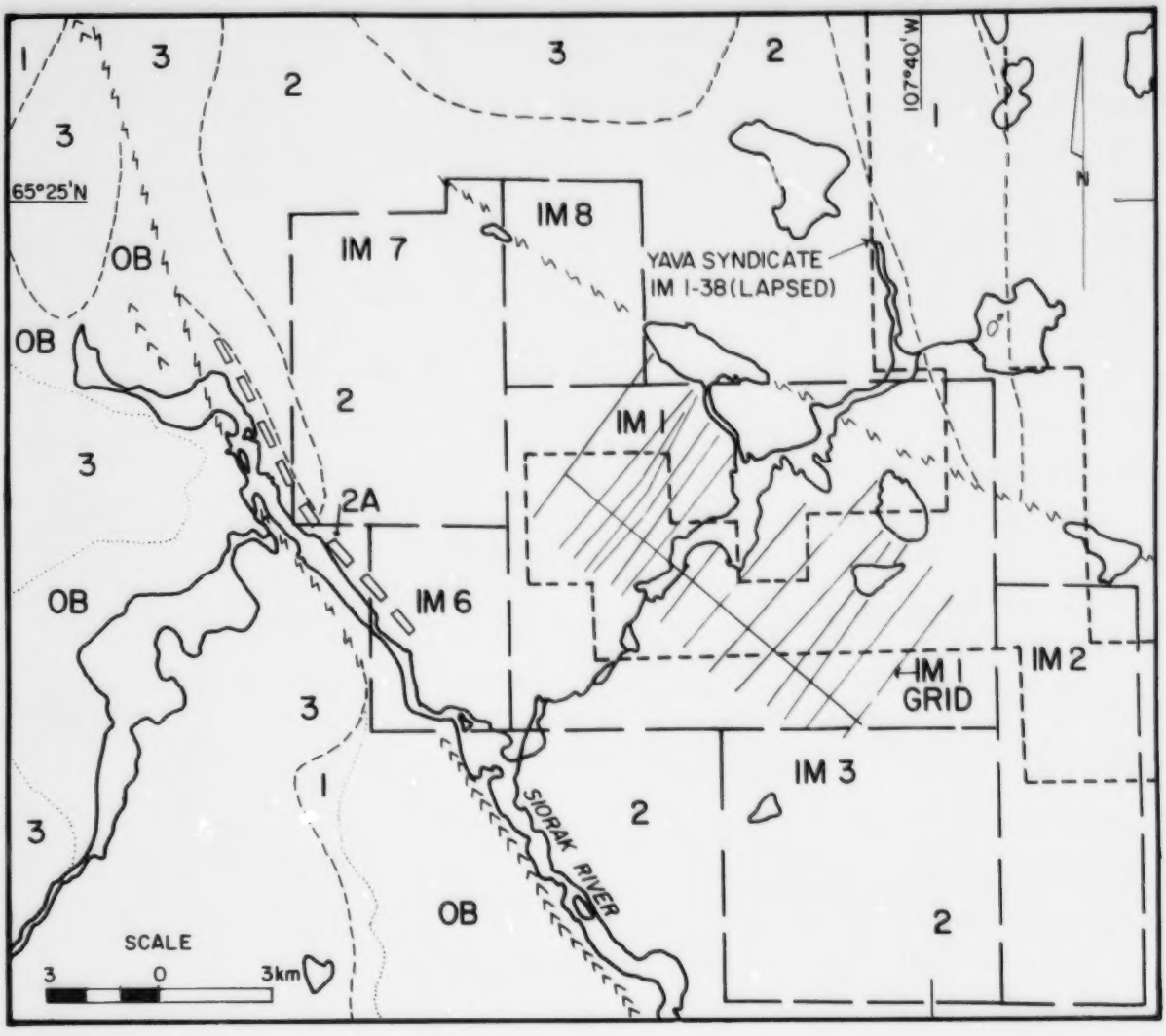
p Pillowed (eg. 7b,p = unit 7, pillow basalt)

## DESCRIPTION

The regional geology has been compiled by Frith (1981a). The claims are mainly underlain by biotite gneisses and schists of the Yellowknife Supergroup, which are probably derived from greywacke-mudstone turbidites. The extreme northeastern corner of IM 1 is underlain by felsic agglomerate (DIAND assessment report 080576). The claims are a few kilometres east of the Hackett River Volcanic Belt. Amphibolitic iron formation is interbedded with Beechey Lake Group metasediments of the Yellowknife Supergroup.

## CURRENT WORK AND RESULTS

A grid, with a 2.4 km long northwesterly base line and winglines averaging about 1.5 km, was constructed on IM 1. The IM 1 grid was explored during the summer of 1985 by geological mapping and rock sampling, magnetic and VLF-EM




LEGEND

QUATERNARY

OB Glacial and post-glacial deposits. <<<<Eskers.

ARCHEAN

3 Granite.

BEECHEY LAKE GROUP

2 Porphyroblastic gneiss and schist derived from greywacke-mudstone turbidites. 2a, iron formation from Frith (1981a). Iron formation units mapped by Cominco Ltd. on IM 1 Grid are not shown.

HACKETT RIVER AND BACK GROUPS

1 Undivided mafic to felsic volcanics. The Hackett River Group (exposed in the southwestern and western part of the map area) includes the Nauna Formation and Ignerit Formation. The Back River Group volcanics are younger than the Hackett River Group and outcrop north of claim IM 1.

*FIGURE 8-14: Geology of the IM claims and grid location (geology simplified from Frith, 1981a).*

surveys and by excavation of four trenches: three in the western part of the grid; one near "Triangle Lake" (Fig. 8-14) in the eastern corner.

## RL 1 CLAIM

Back River Joint Venture
c/o Trigg, Woollett, Olson
Consulting Ltd.
10504-103 St.
Edmonton, Alta., T5H 2V4

Gold
76 G/4
65°05'N, 107°36'W

### REFERENCES

Frith (1981a); Frith and Hill (1975); Frith and Percival (1978); Lambert (1978, 1981); Lord (1951); Schiller and Hornbrook (1964); Seaton (1984); Seaton and Crux (1985).

DIAND assessment reports: 017157, 017160, 081812.

### PROPERTY

RL 1.

### LOCATION

The claim is on the north shore of Fidler Lake (3 km east of Regan Lake), and 440 km northeasterly from Yellowknife (Fig. 8-15).

### HISTORY

The first recorded exploration for gold in the Regan Lake area is by Don Cameron Exploration Ltd. In 1946, they staked ALGOOD 1-24, MAKRAK 1-17 and 5 other claims as one block and the GOODAL and RUSIN claims as a second discrete block (DIAND assessment report 017160). Algood Gold Mines Ltd. was incorporated in January 1947 to acquire the ALGOOD and MAKRAK claims. Exploration, including drilling, done by Don Cameron Exploration Ltd. for Algood Gold Mines is summarized in Lord (1951). The western part of the RUSIN group to the eastern margin of the MAKRAK group are now covered by RL 1. The ALGOOD claims, where most of the work in 1946 and 1947 was concentrated, were centred about 5 km northwesterly from the centre of the present RL 1 claim and lay west of the MAKRAK group.

Work in 1963 and 1964 in the Regan Lake area, on the DON and SAM claims, by Falconbridge Nickel Mines Ltd. is summarized by Schiller and Hornbrook (1964) and Schiller (1965). In 1979 and 1980, Giant Yellowknife Mines Ltd. restaked the Algood property as ALGOOD 1 and 2. Exploration of these claims in 1980-81 included diamond drilling.

During 1982, 1983 and 1984, Noranda Exploration Company Ltd. staked a 30 km long belt of claims, mainly on ground explored as Prospecting Permit 811 (Seaton and Crux, 1985). The belt, which is segmented by the ALGOOD claims, covers a volcanic-sediment contact that trends northwesterly from Fidler Lake. The belt of Noranda claims is indented on its northeastern side by RL 1 and comprises the SIDD, PERU and PU claims. It extends southeast of Regan Lake over largely metasedimentary terrane to meet the area staked by Silver Hart Mines Ltd. and others along the Back River (Fig. 8-15).

Gold hosted by metamorphosed amphibolitic and sulphidic iron formation in Yellowknife Supergroup metasediments has been a major target of companies operating in this area during the early eighties.

### DESCRIPTION

The regional geology has been compiled at 1:250,000 by Frith (1981a) and at 1:50,000 by Lambert (1981), who mapped the Back River Volcanic Complex. RL 1 is mainly underlain by metasediments of the Beechey Lake Group of the Yellowknife Supergroup. The metasediments are close to, but on the low grade side of, the biotite isograd (Frith, 1981a).

RL 1 is near the southeastern extremity of a tongue of mainly andesitic volcanics which connects to the northwest and west with the main body of the Back River Volcanic Complex (Lambert 1978, 1981). Five small areas in the northern and western parts of the claim are underlain by lenses of intermediate to felsic agglomerate (DIAND assessment report 081812).

Frith (1981a) has mapped a zone of sulphide-rich strata within metasediments extending from Fidler Lake northwesterly to Uist Lake. This zone is coincident with a thin unit of oxide-silicate iron formation in the southwestern part of RL 1 and the gold showing on ALGOOD 1 to the northwest.

### CURRENT WORK AND RESULTS

In 1984, work comprised preparation of a 1:10,000 geological map of RL 1, and 1:1000 geological mapping and magnetic surveys of two small (200 by 80 m) grids.

Grey to black, fine-grained greywacke, interbedded with and grading into mudstone, is the predominant rock type mapped, with local thin units of black mudstone and metamorphic equivalents and minor interbedded greywacke.

## BEECHY LAKE NORTH PROJECT

Back River Joint Venture
c/o Trigg, Woollett, Olson
Consulting Ltd.
10504-103 St.
Edmonton, Alta., T5H 2V4

Gold

76 G/9-11,13-16
76 J/14
65°30'-66°07'30"N
106°15'-107°45'W

### REERENCES

Frith (1981a,b,c); Seaton (1984); Seaton and Crux (1985).

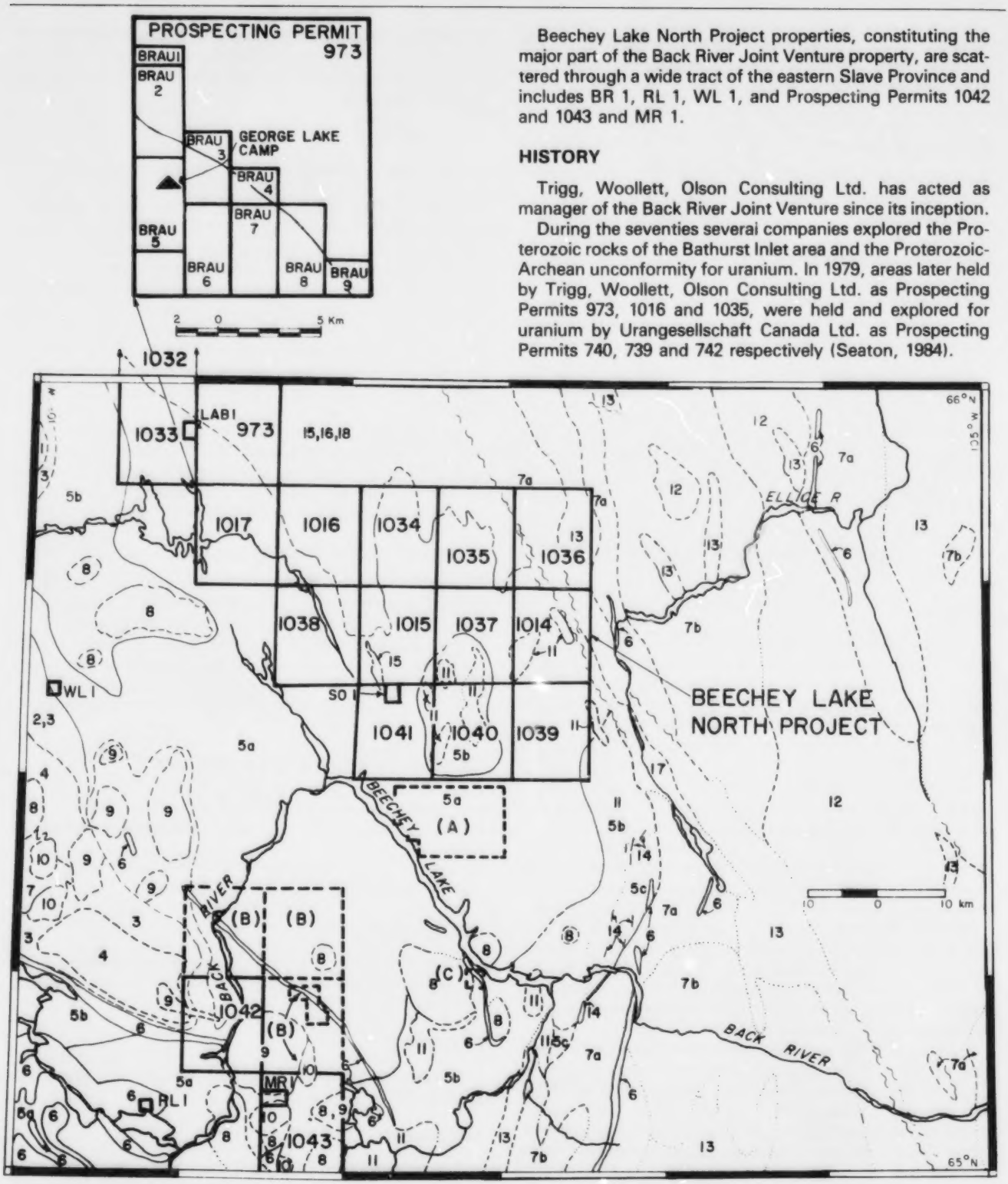
DIAND assessment reports: 081705, 081813, 081822, 081975.

### PROPERTY

Prospecting Permits 973, 1014-1017, 1032-1041; BRAU 1-9, LAB 1, SO 1.

### LOCATION

The property (Fig. 8-15) here described under the caption Beechey Lake North Project consists of a single block of prospecting permits and claims that lie from 500 to 560 km northeasterly from Yellowknife and extend 105 km in a northwesterly direction. The southwestern corner of the property is at the northern end of Beechey Lake.



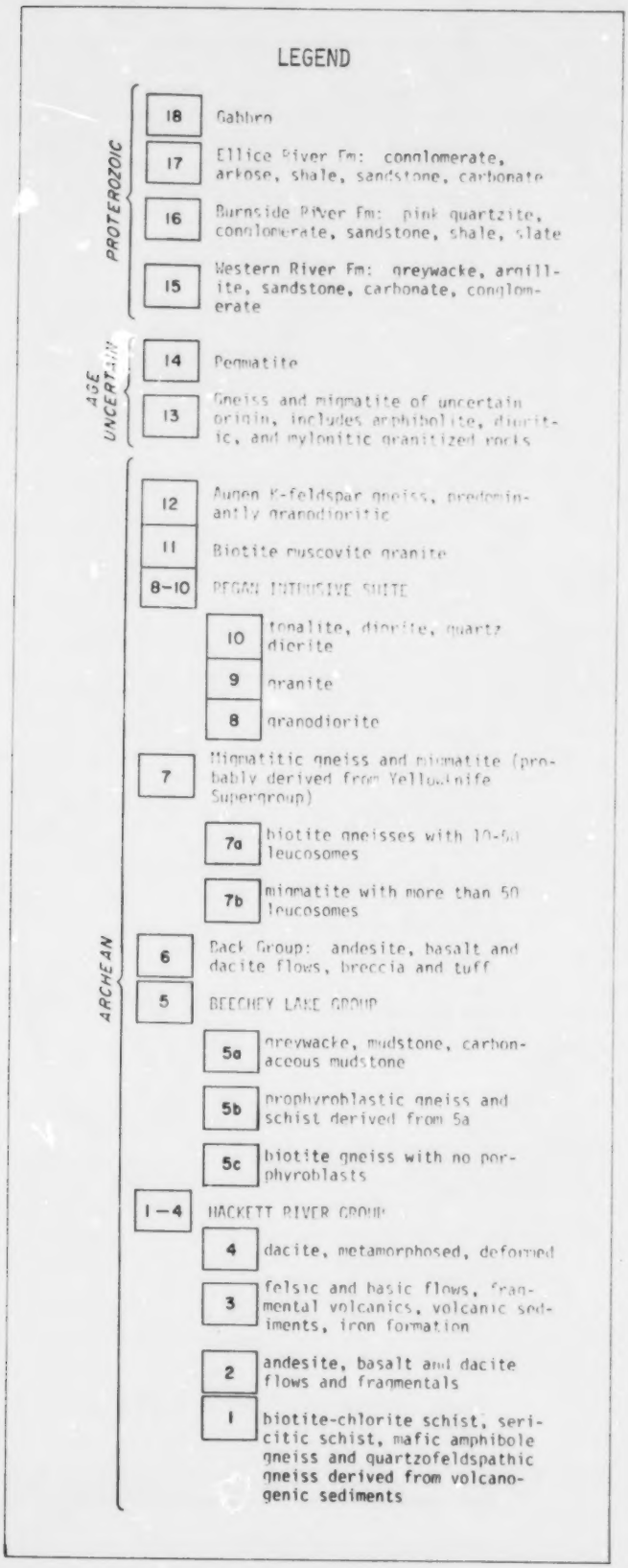

Beechey Lake North Project properties, constituting the major part of the Back River Joint Venture property, are scattered through a wide tract of the eastern Slave Province and includes BR 1, RL 1, WL 1, and Prospecting Permits 1042 and 1043 and MR 1.

## HISTORY

Trigg, Woollett, Olson Consulting Ltd. has acted as manager of the Back River Joint Venture since its inception.

During the seventies several companies explored the Proterozoic rocks of the Bathurst Inlet area and the Proterozoic-Archean unconformity for uranium. In 1979, areas later held by Trigg, Woollett, Olson Consulting Ltd. as Prospecting Permits 973, 1016 and 1035, were held and explored for uranium by Urangesellschaft Canada Ltd. as Prospecting Permits 740, 739 and 742 respectively (Seaton, 1984).

*FIGURE 8-15: Geology of the Beechey Lake area: Prospecting Permits 973, 1014-1017 and 1032-1043 (geology modified from Frith, 1981a,b,c). NOTE: Other claims and permits (A) Bow Valley, (B) Cominco Ltd., (C) Kidd Creek Mines Ltd. shown with dashed outline. Claims other than those of Back River Joint Venture not shown west of 107° 30'W.*


LEGEND
PROTEROZOIC
18 Gabbro
17 Ellice River Fm: conglomerate, arkose, shale, sandstone, carbonate
16 Burnside River Fm: pink quartzite, conglomerate, sandstone, shale, slate
15 Western River Fm: greywacke, argillite, sandstone, carbonate, conglomerate
AGE UNCERTAIN
14 Pegmatite
13 Gneiss and migmatite of uncertain origin, includes amphibolite, dioritic, and mylonitic granitized rocks
ARCHEAN
12 Augen K-feldspar gneiss, predominantly granodioritic
11 Biotite muscovite granite
8–10 REGAN INTRUSIVE SUITE
10 tonalite, diorite, quartz diorite
9 granite
8 granodiorite
7 Migmatitic gneiss and migmatite (probably derived from Yellowknife Supergroup)
7a biotite gneisses with 10-50 leucosomes
7b migmatite with more than 50 leucosomes
6 Back Group: andesite, basalt and dacite flows, breccia and tuff
5 BEECHEY LAKE GROUP
5a greywacke, mudstone, carbonaceous mudstone
5b porphyroblastic gneiss and schist derived from 5a
5c biotite gneiss with no porphyroblasts
1–4 HACKETT RIVER GROUP
4 dacite, metamorphosed, deformed
3 felsic and basic flows, fragmental volcanics, volcanic sediments, iron formation
2 andesite, basalt and dacite flows and fragmentals
1 biotite-chlorite schist, sericitic schist, mafic amphibole gneiss and quartzofeldspathic gneiss derived from volcanogenic sediments

Trigg, Woollett, Olson Consulting Ltd. acquired Prospecting Permit 973 on February 1, 1983 following 1982 reconnaissance. Permits 1014-1017 were acquired in February 1984 and Permits 1032-1041 in February 1985. LAB 1 and SO 1 were recorded in September 1984.

BRAU 1-9 were recorded for Trigg, Woollett, Olson Consulting Ltd. in October 1985 to cover part of the area previously held as Prospecting Permit 973.

Work done on Prospecting Permit 973 in 1983 is summarized in Seaton and Crux (1985) and recorded in DIAND assessment report 081705. Prospecting Permit 973 expired in February 1986.

## DESCRIPTION

Roughly 75% of the area covered by the Beechey Lake North Project is underlain by Archean metasediments of the Beechey Lake Group, comprising greywacke, mudstone, carbonaceous mudstone, iron formation or their metamorphic derivative gneisses and schists (Fig. 8-15). Roughly two-thirds of the Archean metasediments are on the low grade side of the biotite isograd. Only about 10% of the permit area is underlain by metasediments on the high grade side of the staurolite-cordierite isograd (Frith, 1981a,b). The largest area of such rocks surrounds three biotite-muscovite granite stocks (Frith, 1981c), mainly on Prospecting Permits 1037 and 1040. In the southeast corner of the project area, on Permit 1039, the regional metamorphic gradient increases southeasterly towards the Thelon Front. An increase in metamorphic grade is also apparent at the northwestern margin of Prospecting Permit 1033, north of Index Lake, where several granodiorite plutons are exposed within an area of higher grade metasediments (Fig. 8-15).

The Archean metasediments of the project area are isoclinally folded and have a dominant northwesterly structural grain, as indicated by bedding and S1 cleavages. An anomalous west-northwesterly strike of bedding exists in the southern part of Prospecting Permit 1014.

Ten of the fifteen prospecting permits of the Beechey Lake North Project are underlain, to varying extents, by Goulburn Group Proterozoic sediments of the Western River Formation, and more extensively, the Burnside River Formation. Prospecting Permit 1032 is underlain almost entirely by Proterozoic rocks.

## CURRENT WORK AND RESULTS

During 1984 and 1985 Back River Joint Venture continued exploring the property with auriferous iron formation as the essential target.

In 1984, Back River Joint Venture resumed exploration of Prospecting Permit 973, and explored the newly acquired Prospecting Permits 1014-1017 (DIAND assessment reports 081813, 081822). An aeromagnetic expression extends southeasterly from Prospecting Permit 973 continues beneath Proterozoic cover rocks, to emerge in Prospecting Permit 1015. Exploration during 1984 comprised one or more of the following: reconnaissance prospecting, grid construction, detailed geological mapping at 1:100 or 1:1000, ground magnetic and VLF-EM surveys, overburden stripping and trenching, grab

sampling, rock chip and rock channel sampling. The surveys were done at selected localities. Reconnaissance prospecting and 1:10,000 geological mapping were carried out along traverses spaced at 500 m intervals on Prospecting Permits 973, 1017 and 1016, as well as on selected parts of Prospecting Permit 1015. A geophysical orientation survey was completed.

Prospecting Permit 1014 is non-contiguous with the block formed by Prospecting Permits 973 and 1015-1017, and was reported separately (DIAND assessment report 081813). Subsequently, with the acquisition of Permits 1032-1041 in 1985, it became part of the single block constituting the Beechey Lake North Project area (Fig. 8-15).

Work on Prospecting Permit 1014, during 1984, comprised prospecting and 1:10,000 geological mapping, grid construction, and 1:1000 geological mapping, magnetic and VLF-EM surveys.

The Prospecting Permits and claims included in the Beechey Lake North Project constitute roughly 82% of the Back River Joint Venture property.

Expenditures reported as assessment on the Back River Joint Venture property have increased roughly eleven-fold since 1983 and about eighteen times as much ground was held in 1985 as in 1983. Most of these increases in expenditure and ground held have been in the Beechey Lake North Project area.

## WL 1 CLAIM

Back River Joint Vent.
c/o Trigg, Woollett, Olson
Consulting Ltd.
10504-103 St.
Edmonton, Alta., T5H 2V4

Gold
76 G/12
65°35'30"N,
107°52'30"W

### REFERENCES

Frith (1981a); Frith and Percival (1978); Seaton (1978). DIAND assessment report: 081811.

### PROPERTY

WL 1.

### LOCATION

WL 1 is near Friday ("Aitch") Lake, roughly 450 km northeasterly from Yellowknife and 3 km southeasterly from the Yava massive sulphide deposit (Seaton, 1978).

### HISTORY

Though the Hackett River Volcanic Belt, the margin of which passes within 100 m of the southwestern corner of WL 1, was heavily staked during a base metal exploration surge in the seventies, the WL property has not been staked previously.

WL 1 was recorded in September 1982 after prospecting and rock sampling.

### DESCRIPTION

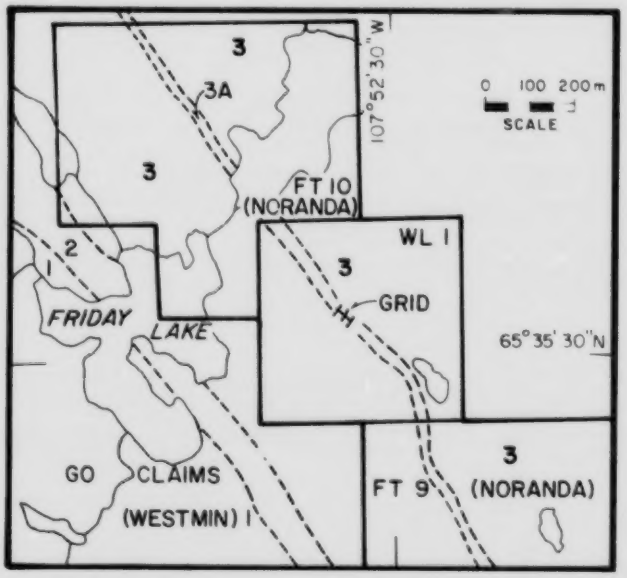
WL 1 is underlain by Beechey Group metasediments, which include a 50 to 75 m wide unit of iron formation. The iron formation strikes northeasterly across the claim.

Northeast and southwest of the iron formation are mudstones with minor interbedded greywackes. The metasediments generally young to the northeast away from volcanics (Fig. 8-16), with some local reversals caused by folding.

The Beechey Lake Group sediments underlying WL 1 are on the high grade side of the biotite isograd, and the low grade side of the staurolite-cordierite isograd (Frith, 1981).

### CURRENT WORK AND RESULTS

In 1984, WL 1 was geologically mapped at 1:1000 and prospected. An 80 by 60 m grid was constructed, roughly in the centre of WL 1. The grid was explored by detailed geological mapping and magnetic and VLF-EM surveying. A trench, excavated in the central part of the grid, was mapped and sampled.




LEGEND

BEECHEY GROUP

3 Mudstone with minor interbedded greywacke. 3A Mainly oxide facies iron formation; interbedded magnetite and chert.

HACKETT RIVER GROUP

2 Ignerit Formation: felsic to mafic volcanic rocks, carbonate-cemented volcanic rocks, chert.

1 Nauna Formation: felsic volcanic rocks

*FIGURE 8-16: Geology of the WL 1 and FT 9, 10 claims (geology from Frith, 1981; modified mainly from DIAND assessment report 081811).*

## BATHURST INLET, SOUTHEAST (WESTERN RIVER-GORDON BAY) AREA

The Bathurst Inlet southeast area is predominantly underlain by Yellowknife Supergroup metasediments and their migmatitic derivatives, intruded by leucogranite and granodiorite plutons (Figs. 8-17, 8-18).

A belt containing zones of amphibolitic metamorphosed iron formation has been extensively staked for its gold potential.

### PROSPECTING PERMITS 1066-1069

Echo Bay Mines Ltd.
3300 Manulife Place
10180-101 St.
Edmonton, Alta., T5J 3S4

Gold
76 J/1,2
66°00'-66°15'N
106°15'-107°00'W

#### REFERENCES

Thompson and others (1985).
DIAND assessment report: 081910.

#### PROPERTY

Prospecting Permits: 1066, 1067, 1068, 1069.

#### LOCATION

The permits are about 520 km northeasterly from Yellowknife and 100 km southeasterly from Bathurst Inlet Lodge.

Prospecting Permits 1066, 1067, 1068 and 1069 cover NTS quadrants 76 J/1 SW, 76 J/2 NW, 76 J/2 NE, 76 J/2 SE respectively.

#### HISTORY

The permits were granted on February 1, 1985.

#### DESCRIPTION

The geology of the permit area from Thompson and others (1985) is shown in Figure 8-17.

#### CURRENT WORK AND RESULTS

The permits were prospected and reconnoitered using low-level helicopter and ground traverses to find auriferous amphibolitic and sulphidic iron formation.

No substantial thicknesses of iron formation were found and all assays were less than 2 g/t Au.

### G & T, FOX 1, 2 CLAIMS

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Gold
76 J/11
66°50'N, 107°20'W

#### REFERENCES

Thompson and others (1985, 1986).
DIAND assessment report: 081819.

#### PROPERTY

G & T 1-6; FOX 1, 2.

#### LOCATION

The claims are 580 km northeasterly from Yellowknife and 15 km southeasterly from Tinney Cove, Bathurst Inlet.

#### HISTORY

G & T 1-6 are owned by Bear Creek Hills Estate Ltd. G & T 1 was recorded in October 1982; G & T 2-6 in September 1983. Drilling on G & T 2 in 1984 was done by Silver Hart Mines by agreement with Bear Creek Hills Estate. Silver Hart recorded FOX 1 and 2 and other adjoining claims in March 1984.

#### DESCRIPTION

The regional geology has been mapped by Thompson and others (1985, 1986). The claims are largely underlain by nodular schist and metagreywacke of the Yellowknife Supergroup (Fig. 8-18). These metasediments are on the low grade side of the sillimanite isograd, which passes through the northeastern corner of the property.

#### CURRENT WORK AND RESULTS

During 1984, seven holes were diamond drilled on G & T 2, and intersected quartz-muscovite-biotite schists with cordierite and, locally staurolite, porphyroblasts, and amphibolite or amphibole schist.

The target, amphibole schist, is locally garnetiferous and with disseminations, layers and stringers of magnetite, pyrrhotite and pyrite. The sulphidic-amphibole schist is locally auriferous, the highest assay being 10 g/t Au across 0.37 m.

During 1984-85, Silver Hart Mines, Echo Bay Mines Ltd. and others staked a considerable amount of ground in two belts (Fig. 8-18).

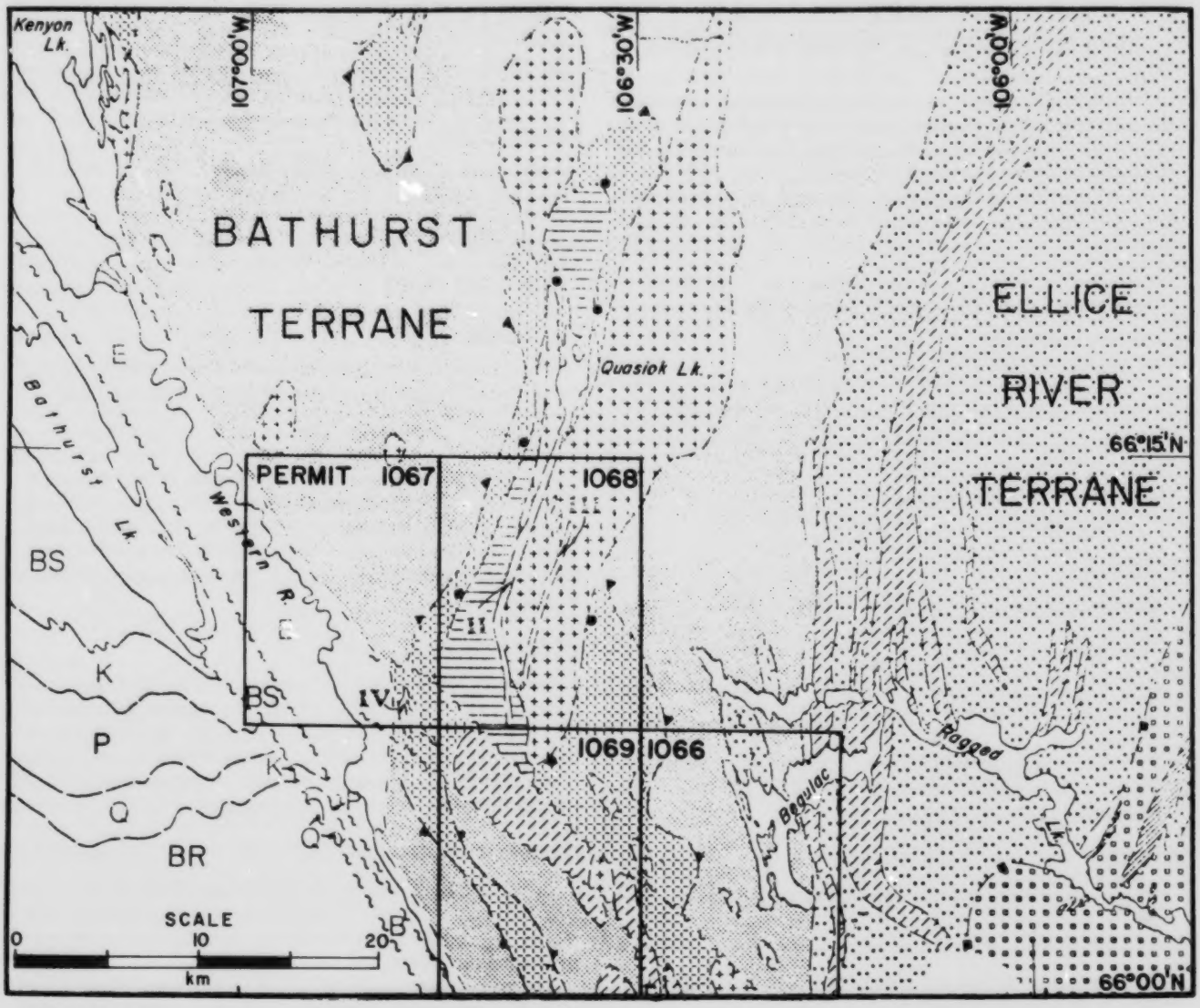



*FIGURE 8-17: Geology of the Prospecting Permits 1066-1069 (geology from Thompson and others, 1985).*

## THE WILBERFORCE BASIN

The "Wilberforce Basin" is an irregularly shaped area of metasediments extending from the James River in the north across the Hood River, to the Booth River in the south. Wilberforce Falls lies just east of, and outside, the area underlain by the metasediments of the basin.

## PISTOL (FARN-KNUT) PROJECT

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta.,
T8A 3X6

Gold
76 K/15, 76 N/2
66°59'-67°05'N,
108°43'-108°55'W

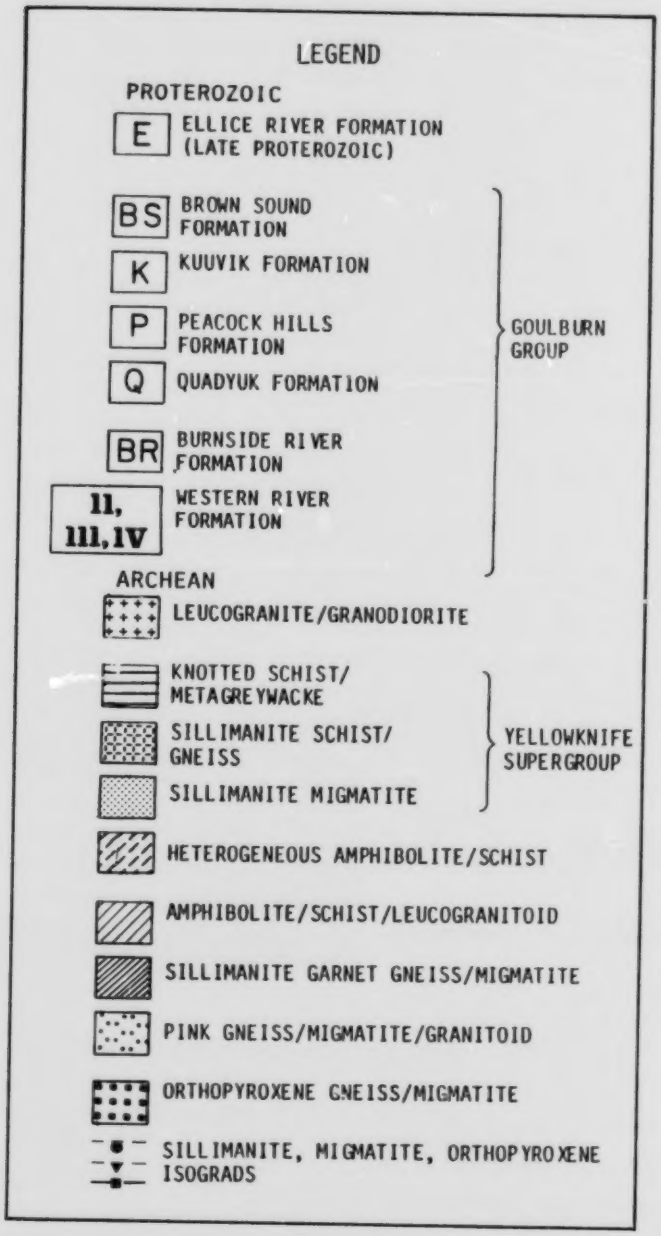
### REFERENCES

Fraser (1964); Schiller (1965); Thorpe (1966, 1972); and Seaton (1984).

DIAND assessment reports: 017144, 017151, 017163, 017166 and 081345.

### PROPERTY

FARN; KNUT; PISTOL 1-3; WOLF 2-4, 5-9.




## LOCATION

The property is 575 km northeasterly from Yellowknife and less than 1 km west of the Hood River. Wilberforce Falls is 2.5 km north of the property. Access is by float plane to "Pistol Lake" in the western part of the property; an esker 3 km from the property has been used by Twin Otter aircraft on wheels.

## HISTORY

Noel Avadluk discovered gold in the area in 1964 and staked 36 NOEL claims to cover the showings. That year the claims were optioned by Roberts Mining Company Ltd. Subsequent exploration history is summarized by Schiller (1965), Thorpe (1966, 1972) and Seaton (1984). The showings were restaked as the FARN and KNUT claims by Goldfields Exploration Canada Ltd. in October 1979.

In 1984, FARN and KNUT were optioned by Silver Hart Mines Ltd. from Goldfields Exploration Canada Ltd.

## DESCRIPTION

The property is largely underlain by Yellowknife Supergroup metasediments, which are intruded by large diabase sills or dykes and granitoid rock. Auriferous, sulphidic, silicate- and oxide-facies iron formation units within the metasediments are the exploration target.

## CURRENT WORK AND RESULTS

Mapping and diamond drilling programs commenced in 1984. A total of 346 m in eight holes was drilled on FARN, and a total of 692 m in six holes on KNUT.

In 1985, 5550 m of drilling in 35 holes was completed on FARN and KNUT. Much of this drilling was on the F-Zone south of "Knutsen Lake" on KNUT and on the G-Zone east of Knutsen Lake.

Geological mapping revealed isoclinal folds with a steep southerly plunge and two units of iron formation. The F-Zone is in an amphibolitic iron formation unit, which is locally garnetiferous. To the southeast, the second iron formation hosts the G-Zone, which is a banded magnetite- and cummingtonite-bearing chert, locally containing pyrrhotite, arsenopyrite and pyrite, and cross-cut by quartz veins. Folding is on a roughly 300 m wavelength. Most dips are 35° to 50° to the west.

Mapping suggests that metamorphosed iron formation units have been locally refolded about northeasterly axes, contained in regional cleavage-foliation planes that are vertical or steeply southeasterly dipping.

Silver Hart Mines staked periferally to the FARN-KNUT claim block and recorded WOLF 2, in May 1984, WOLF 5, 9 in September 1984 and PISTOL 1-3 in September 1985.

# HIGH LAKE AND ANIALIK RIVER SUPRACRUSTAL BELTS

The High Lake Supracrustal Belt (Easton and others, 1982) is part of a northerly trending complex of mainly volcanic rocks, intruded to the west by extensive granitic plutons and flanked to the east by volcaniclastic, carbonate and turbidite sediments.

The Anialik River Supracrustal Belt lies northwest of the High Lake Supracrustal Belt to which it is linked by an "isthmus" of volcanic rocks.

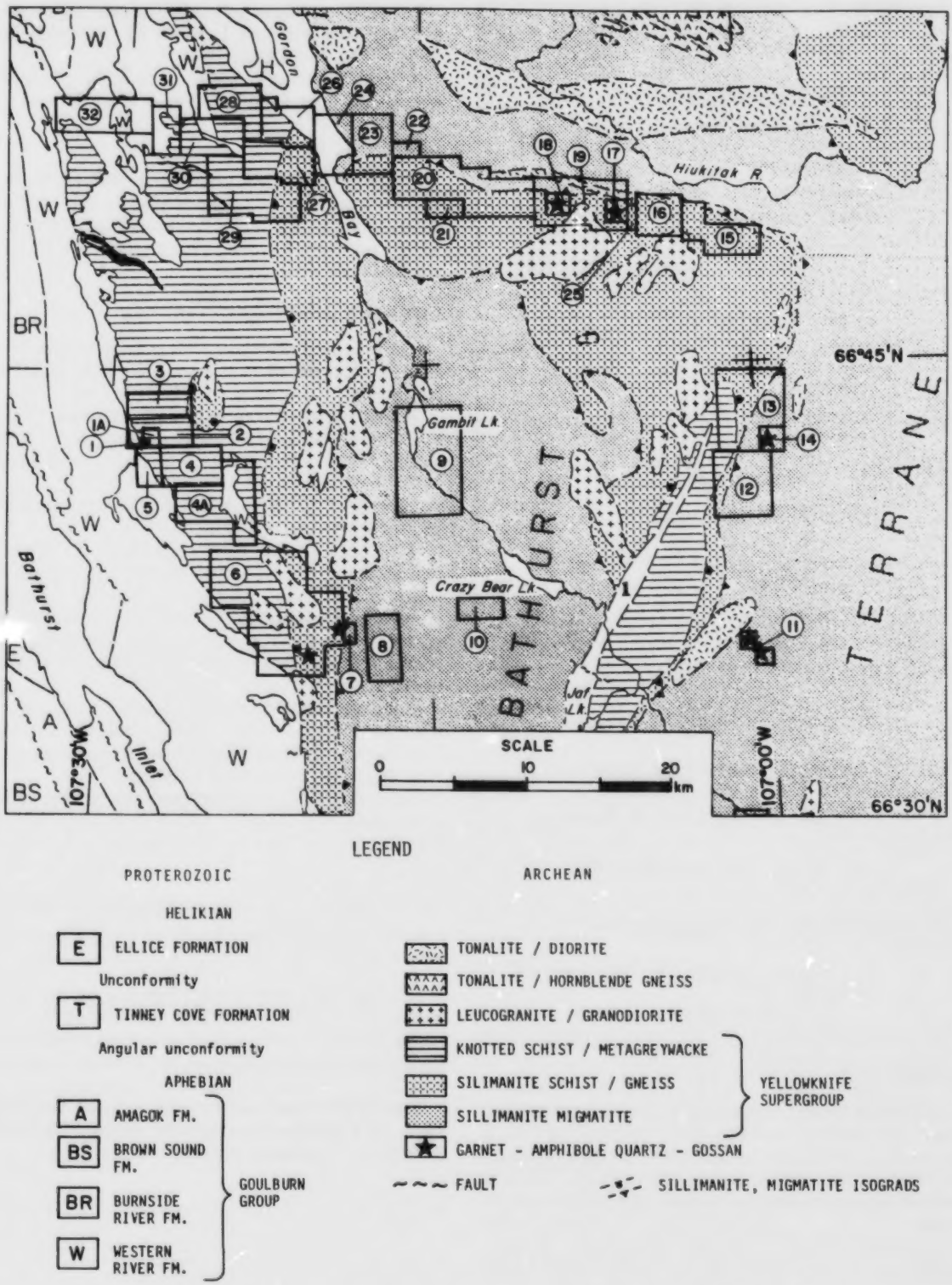



*FIGURE 8-18: Geology of the G&T, FOX 1, 2 and other claims (geology from Thompson and others, 1985).*

**KEY TO PROPERTIES ON FIG. 8-18**

| No. | NTS | Registered | Claims | Owner |
|---|---|---|---|---|
| 1 | 76J/11 | 82-10-18 | G&T 2 | BCHE |
| 1A | 76J/11 | 83-09-19 | G&T 1,3,6 | BCHE |
| 2 | 76J/11 | 84-03-26 | FOX 1, 2 | SHML |
| 3 | 76J/11 | 85-09-09 | FOX 5, 6 | SHML |
| 4 | 76J/11 | 84-03-26 | FOX 3 | SHML |
| 4A | 76J/11 | 84-03-26 | CHAR 1, 2 | SHML |
| 5 | 76J/11 | 85-09-09 | FOX 4 | SHML |
| 6 | 76J/11 | 84-10-09 | HEN 1-6 | EBML |
| 7 | 76J/11 | 85-03-18 | BC 6 | BCHE |
| 8 | 76J/11 | 85-08-22 | NEST | EBML |
| 9 | 76J/10,11 | 85-08-12 | JAN 1-3 | EBML |
| 10 | 76J/10 | 84-08-28 | CLEAR | GBW |
| 11 | 76J/9,10 | 85-03-18 | BC 4,5 | BCHE |
| 12 | 76J/9,10 | 85-09-27 | WING | EBML |
| 13 | 76J/9,10 | 85-09-13 | LB 1-2 | LEA |
| 14 | 76J/9 | 85-10-28 | BC 3 | BCHE |
| 15 | 76J/15,16 | 85-10-17 | EGG 2,3 | EBML |
| 16 | 76J/15 | 85-07-25 | EGG | BCHE |
| 17 | 76J/15 | 85-03-18 | BC 2 | BCHE |
| 18 | 76J/15 | 85-03-18 | BC 1 | BCHE |
| 19 | 76J/15 | 85-09-3,6 | BEAR 1, 4-6 | EBML |
| 20 | 76J/14,15 | 85-08-22 | BEAR 2,3 | EBML |
| 21 | 76J/15 | 85-09-06 | BEAR 7 | EBML |
| 22 | 76J/14 | 85-10-17 | BEAR 10 | EBML |
| 23 | 76J/14 | 85-09-27 | BEAR 9 | EBML |
| 24 | 76J/14 | 85-09-27 | HUNT 8 | EBML |
| 25 | 76J/14 | 85-10-17 | BEAR 8 | EBML |
| 26 | 76J/14 | 85-10-17 | HUNT 7,13 | EBML |
| 27 | 76J/14 | 84-10-09 | HUNT 1,2 | EBML |
| 28 | 76J/14 | 85-09-27 | HUNT 9,10 | EBML |
| 29 | 76J/14 | 85-08-22 | HUNT 4,5 | EBML |
| 30 | 76J/14 | 85-07-29 | HUNT 3 | EBML |
| 31 | 76J/14 | 85-10-17 | HUNT 6 | EBML |
| 32 | 76J/13,14 | 85-09-17 | HUNT 11,12 | EBML |

*Abbreviations:

BCHE Bear Creek Hills Estate Ltd.
EBML Echo Bay Mines Ltd.
GBW GB Warner
LEA Lloyd E. Anderson
SHML Silver Hart Mines Ltd.

## BLACKRIDGE 1, BR 1,2 CLAIMS

Aber Resources Ltd.
400, 805-8th Ave. SW.
Calgary, Alta.,
T2P 1H7

Gold
76 L/15
66°52'N, 110°52'W

### REFERENCES

Fraser (1964).
DIAND assessment reports: 018788, 019502, 060671, 060819, 061408 and 061873.

### PROPERTY

BLACKRIDGE 1; BR 1,2.

### LOCATION

The claims are 425 km north-northeasterly from Yellowknife.

### HISTORY

BLACKRIDGE 1 was recorded in September 1983. Borealis Exploration Ltd. explored NTS area 76 L/15 (DIAND assessment reports 018788, 019502, 060671, 060819, 061408 and 061873).

### DESCRIPTION

The claim lies in the southern part of the High Lake Supracrustal Belt. Fraser (1964) mapped this area at a reconnaissance scale of 1:506,880.

### CURRENT WORK AND RESULTS

In 1985, BLACKRIDGE 1 was explored with mapping, and magnetic and VLF-EM surveying. A weakly auriferous zone was explored by diamond drilling. Results were presumably sufficiently encouraging to warrant the staking of BR 1 and BR 2 to the north and east of BLACKRIDGE 1. BR 1 and 2 were recorded in October 1985.

## GRUMPY CLAIM

Echo Bay Mines Ltd.
3300 Manulife Place
10180-101 St.
Edmonton, Alta., T5J 3S4

Gold
76 M/10
67°36'45"N,
110°40'30"W

### REFERENCES

Easton and others (1982).
DIAND assessment report: 081982.

### PROPERTY

GRUMPY.

### LOCATION

The property, 580 km north-northeasterly from Yellowknife, is at the south end of "Grumpy Lake", a small lake which drains into the Kennarctic River.

### HISTORY

GRUMPY was recorded in August 1984.

### DESCRIPTION

The claim is underlain mainly by granitoid rock (mainly monzogranite and minor diorite), felsic volcanics and metasediments (greywacke turbidites). The regional geology has been mapped at 1:31,680 by Easton and others (1982).

### CURRENT WORK AND RESULTS

The discovery of auriferous quartz veins at the south end of "Grumpy Lake" in June 1984 was followed by more detailed sampling, staking and grid construction (Fig. 8-19). The grid covers part of a body of diorite to quartz-diorite. The quartz-diorite hosts several shallow-dipping auriferous quartz veins. Arsenopyrite, pyrite, chalcopyrite, pyrrhotite, chlorite and tourmaline are reported to be associated with the vein quartz and, together, they locally account for as much as 10%

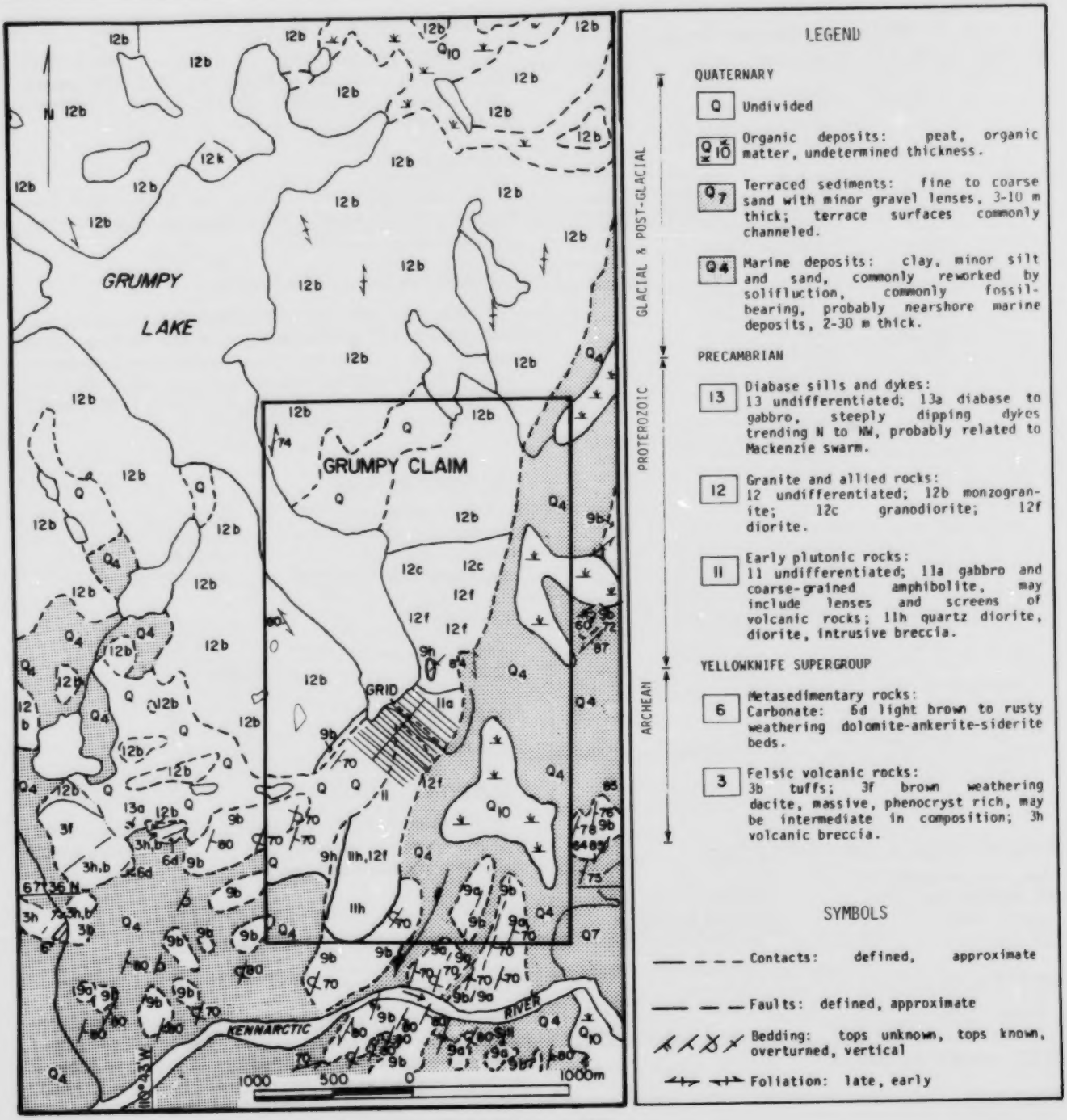

GRUMPY LAKE
GRUMPY CLAIM
GRID
KENNARCTIC RIVER
1000 500 0 1000m
LEGEND
QUATERNARY
Q Undivided
Q10 Organic deposits: peat, organic matter, undetermined thickness.
Q7 Terraced sediments: fine to coarse sand with minor gravel lenses, 3-10 m thick; terrace surfaces commonly channeled.
Q4 Marine deposits: clay, minor silt and sand, commonly reworked by solifluction, commonly fossil-bearing, probably nearshore marine deposits, 2-30 m thick.
PRECAMBRIAN
13 Diabase sills and dykes: 13 undifferentiated; 13a diabase to gabbro, steeply dipping dykes trending N to NW, probably related to Mackenzie swarm.
12 Granite and allied rocks: 12 undifferentiated; 12b monzogranite; 12c granodiorite; 12f diorite.
11 Early plutonic rocks: 11 undifferentiated; 11a gabbro and coarse-grained amphibolite, may include lenses and screens of volcanic rocks; 11h quartz diorite, diorite, intrusive breccia.
YELLOWKNIFE SUPERGROUP
6 Metasedimentary rocks: Carbonate: 6d light brown to rusty weathering dolomite-ankerite-siderite beds.
3 Felsic volcanic rocks: 3b tuffs; 3f brown weathering dacite, massive, phenocryst rich, may be intermediate in composition; 3h volcanic breccia.
GLACIAL & POST-GLACIAL
PROTEROZOIC
ARCHEAN
SYMBOLS
Contacts: defined, approximate
Faults: defined, approximate
Bedding: tops unknown, tops known, overturned, vertical
Foliation: late, early

*FIGURE 8-19: Geology of the GRUMPY claim (geology from Easton and others, 1982).*

of the vein rock. The wall rock is commonly silicified and chloritized.

The outcrop of the MOV vein and 7 trenches on the MOV vein were chip sampled, as were several other quartz veins on the grid. Quartz boulders from various parts of the grid were also sampled. Gold assays were encouraging but silver assays were low.

A levelling survey was performed and the grid was contoured at 3 m intervals.

Soil samples from the grid were assayed for gold, arsenic and copper. Gold and arsenic anomalies were frequently coincident, including one over the MOV vein.

VLF-EM, total field magnetic and magnetic gradient surveys were used to explore the grid. The total field magnetic

survey outlined iron-rich phases of the diorite. The VLF-EM and magnetic gradient surveys gave little useful information.

## ARCADIA PROPERTY

Echo Bay Mines Ltd.
10180-101 Street
Edmonton, Alta.,
T5T 3S4

Gold
76 M/11
67°40'00"-67°44'15"N
111°18'45"-111°27'00"W

### REFERENCES

Fraser (1964); Gibbins and others (1977); Jackson and others (1985); Padgham and others (1976); Schiller (1965); Seaton (1978, 1984); Seaton and Crux (1985); Seaton and Hurdle (1978); Tirrul and Bell (1980) and Yeo and others (1983).

### PROPERTY

DOE 1; 50 H; 1 MC; 18 N; 42 P; 20 Q; 5 R; 2 SEADOG and 7 X claims.

### LOCATION

The property (Fig. 8-20) is 600 km north-northeasterly from Yellowknife. The centre of the property is roughly 14 km southwesterly from Grays Bay, Coronation Gulf.

### HISTORY

The exploration history is summarized in Gibbins and others (1977), Padgham and others (1976), Schiller (1965), Seaton (1978, 1984), Seaton and Crux (1985) and Seaton and Hurdle (1978).

### DESCRIPTION

Maps by Yeo and others (1983) at 1:31,680 and Jackson and others (1985) at 1:30,000 include the "Arcadia" property area. Geology much simplified from the latter map is shown in Figure 8-20, which shows the location of the main veins relative to claim blocks, and topographic features.

Numerous assessment reports describing work in the area, mainly in the sixties, are filed. Some of these reports include geological maps.

### CURRENT WORK AND RESULTS

During 1984, Echo Bay Mines Ltd. drilled 68 holes totalling about 10,600 m. From north to south across the property (Fig. 8-20), the following veins were tested: the Fred Vein (10 holes), the North Vein (45 holes), the Sidewalk Vein (10 holes) and the No. 3 or C Vein (4 holes).

Tonnage and grade estimates by Watts, Griffis and McOuat (for Canuc Resources Ltd. from which Echo Bay Mines optioned the property) and by Echo Bay Mines differ greatly. Echo Bay Mines estimated proven, probable and possible reserves at 145,850 t (160,772 tons) grading 12.0 g/t Au (0.35 oz/ton) in the North Vein Central and 34,780 t (38,338 tons) grading 15.1 g/t Au (0.44 oz/ton) in the Fred Vein. Watts, Griffis and McOuat, using different criteria, estimate proven and probable reserves to be somewhat larger - 668,595 t (737,000 tons) grading 7.2 g/t Au (0.21 oz/ton) and 91,625 t (101,000 tons) at 8.6 g/t Au (0.25 oz/ton) respectively (Northern Miner, May 23, 1985).

## EOKUK INLIER

The Eokuk Inlier or Uplift (of Archean rocks) is flanked to east, west and south by Aphebian sediments and to the north by the waters of Coronation Gulf. It is essentially composed of granitoid rocks, minor mafic and ultramafic intrusives and by gneissic granitoid rocks.

## NERAK CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101 St.
Edmonton, Alta., T5J 3S5

Gold, Silver,
Nickel, Cobalt
86 P/9
67°40'N, 112°15'W

### REFERENCES

Hoffman and others (1983); Seaton and Crux (1985).
DIAND assessment report: 081837.

### PROPERTY

NERAK 1-4.

### LOCATION

The claims are on and near the shore of Coronation Gulf, 590 km northerly from Yellowknife and 35 km west of the mouth of the Tree River.

### HISTORY

The claims were recorded in the spring of 1983 and acquired by Westsun Petroleums and Minerals Ltd. The property was mapped and prospected and a native silver-bearing quartz-carbonate vein was sampled.

In March 1984, Echo Bay Mines Ltd. obtained an option on the NERAK 1-4 claims.

### DESCRIPTION

The claims cover part of the Archean Eokuk Inlier (Fig. 8-21), which is flanked by the Tree River Fold Belt and the Asiak Fold and Thrust Belt (Hoffman and others, 1983) and, to the north, by the waters of Coronation Gulf.

The Eokuk Inlier is composed largely of granitoid rocks which are penetrated by late Proterozoic Coronation gabbro sills.

The silver-bearing Nerak Vein (on NERAK 1) is northwesterly trending, moderately to steeply dipping and hosted by a mafic-ultramafic sill.

### CURRENT WORK AND RESULTS

In 1984, Echo Bay Mines prospected NERAK 1-4 and constructed a 400 by 200 m grid covering the northwesterly trending Nerak Vein and its inferred on-strike extensions. The grid, in the eastern part of NERAK 1, was explored by: geological mapping at 1:500 scale, soil sampling, with

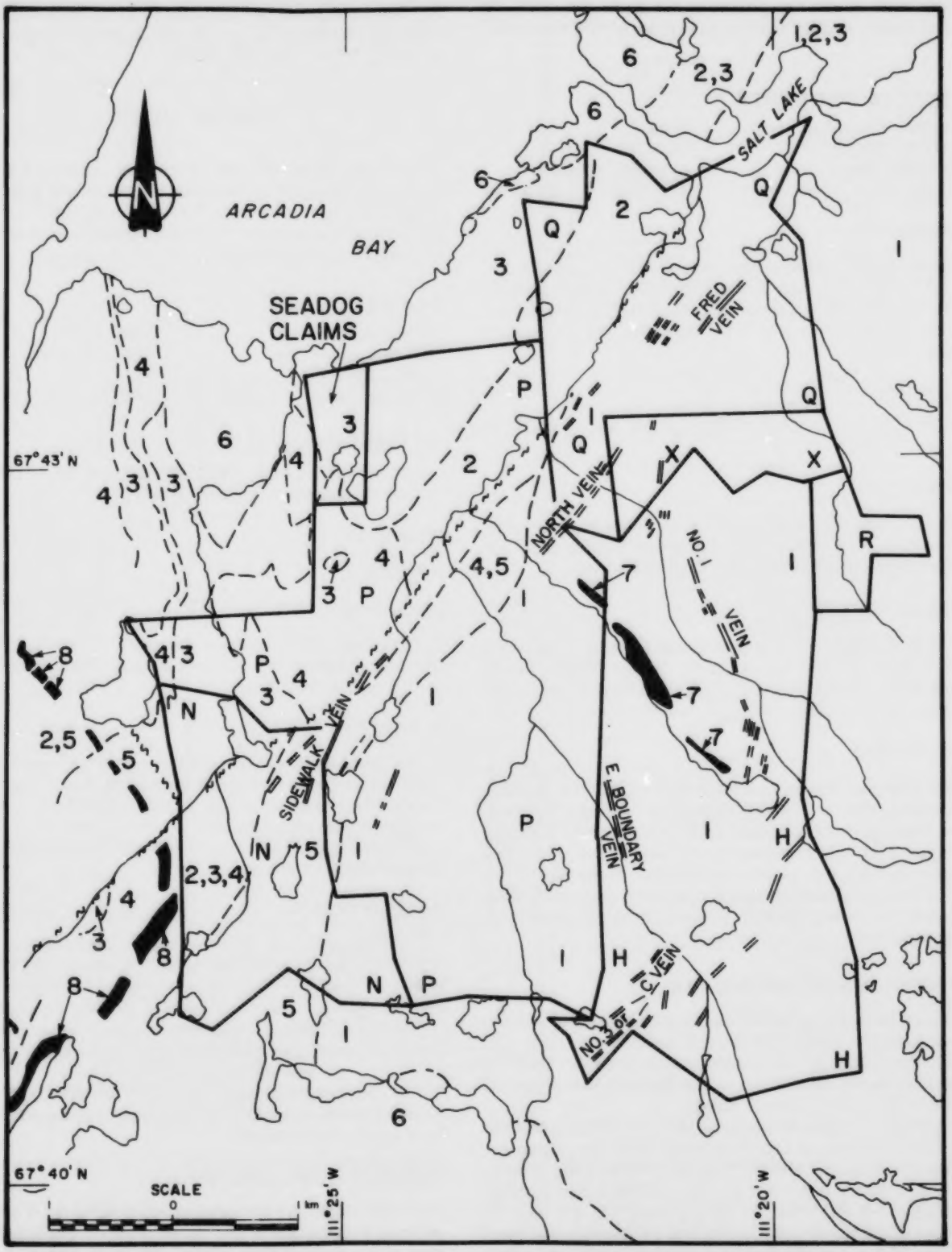



*FIGURE 8-20: Geology of the "Arcadia" Property: claim groups and main auriferous veins (geology, much simplified, after Jackson and others, 1985).*

LEGEND

ARCHEAN OR PROTEROZOIC

auriferous quartz veins; age unknown

PROTEROZOIC

8 Gently dipping gabbro and diabase dykes and sills of the Hadrynian Franklin Swarm

7 North-northwest trending dykes, possibly of the Helikian Mackenzie Swarm

ARCHEAN

6 Granite-granodiorite: biotite-hornblende granite -granodiorite intruded by pink quartz+/-feldspar porphyry and green to black diabase and gabbro dykes; chlorite-biotite granite (quartz-rich) intrusive into units 1 and 4

5 Mixed plutonic and volcanic rocks: mixed meta-gabbro/diorite and fine grained amphibolite or chlorite schists and/or fine grained pink felsic rocks (volcanic rocks or pink leucocratic felsic dykes, varying from fine grained quartz-feldspar phyric to aplitic and to fine-grained granitic); alternating fine grained granite or pink-weathering quartz +/- feldspar porphyry and metagabbro/diorite

4 Early plutonic rocks: metagabbro/diorite and coarse-grained amphibolite; metadiorite to quartz diorite

3 Felsic volcanic rocks: mainly pink-weathering quartz +/- feldspar porphyry, often containing blue-grey oval to round quartz eyes, and pink leucocratic felsic dykes varying from fine grained and quartz/feldspar phyric to aplitic to fine grained granitic

2 Intermediate volcanic rocks: mainly mixed intermediate to mafic rocks (chlorite schists and amphibolites); lesser amounts of: massive to bedded, plagioclase-phyric flows (?) often brown weathering; fragmental (intermediate fragments in a matrix of variable composition); thin banded unit consisting of intermediate to mafic layers with lesser felsic volcanic layers

1 Anialik River Granite Gneiss Complex (in part possibly older than supracrustal rocks)

Legend modified and abbreviated from Jackson and others (1985).

Letters N, P, Q, etc. denote claim groups (eg. N claims). Most of property has been converted to mining leases.

analyses for silver, nickel and cobalt; and VLF-EM and scintillometer surveys. The Nerak Vein was tested by 20 diamond drill holes; a nearby sulphide-bearing zone by one hole. A total of 827 m was drilled.

Geological mapping showed the Nerak Vein to be hosted by a crudely layered, mafic-ultramafic sill of unknown age, that dips moderately to the west. The sill comprises diorite, gabbro, pyroxenite, peridotite, hornblendite and sulphide cumulate rock. Peridotite was not logged in drill core, though heavily serpentinized pyroxenite was reported. The southern part of the grid was mapped as undifferentiated gneiss, granite gneiss and migmatite. Numerous quartz-carbonate veins and granophyre, granite, aplite and pegmatite dykes cross the grid. The veins trend northwesterly and the dykes range from west-northwesterly to north-northwesterly in trend. Five main sulphide cumulate zones were outlined in the western half of the grid; all are cut by the Nerak Vein.

Twenty holes, along a strike length of 180 m, were drilled, with drill sites at 20 m intervals. Drill core samples were analyzed for gold, silver, nickel, cobalt and, in a few cases, platinum. Except for two holes, where concentrations of 'high-grade' native silver across 0.3 cm were intersected, assays were uniformly low (mostly less than 1.0 g/t Ag across narrow vein intercepts). Nickel and cobalt have been reported accompanying silver in the Nerak Vein.

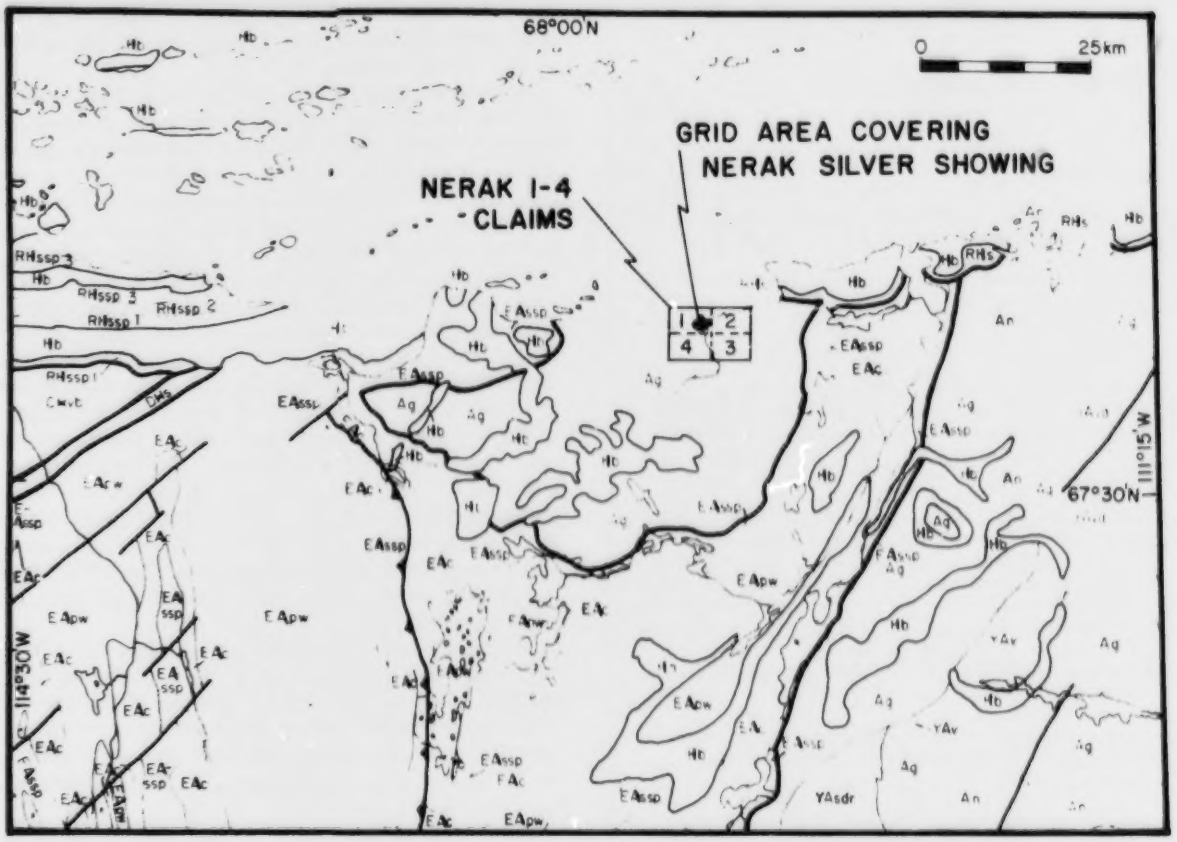
Drilling showed that the Nerak Vein dips 40° to 60° to the northwest. The apparent dip of the mafic-ultramafic sill is relatively shallow compared to the dip of the Nerak Vein.

Soil sampling outlined several coincident anomalous concentrations of silver, nickel and cobalt that are, in part, related to the Nerak Vein, and in part, correlative with sulphide cumulate zones.

VLF-EM conductors were in many cases explained by conductive overburden or topographic features, but along 20 m of its length, the Nerak Vein appears to be conductive. In the eastern corner of the grid a 30 m long conductor, a silver anomaly in soils and quartz carbonate veins may be mutually related. Sulphide cumulate zones surprisingly are not conductive in the area surveyed.

No additional silver showings nor areas underlain by mafic-ultramafic complexes were found through prospecting.

The Nerak Vein shows that precious metal deposits, in the northern Slave Province, may be hosted by a variety of rocks and are commonly found in areas where the late Proterozoic Coronation gabbro sills cut Archean and younger rocks. Such deposits are exemplified by the "Arcadia" property auriferous quartz veins, near Grays Bay (76 M/11), the Grumpy Lake gold-bearing quartz veins (76 M/10) and the Roberts Lake silver deposits (77 A/3). If these late, essentially undeformed, precious metal-bearing veins are found in both the plutonic and supracrustal rocks of the northern Slave Province and if there is a Cobalt, Ontario-style spacial association of the veins with mafic sills and with sulphidic zones in the wall rocks, then a wide area of Archean and other pre-Coronation-sills rocks may be considered as potentially fruitful prospecting ground. In much of the northern Slave Province outcrop is abundant and the ground is well suited to traditional prospecting, as are vein-type precious metal deposits. Hitherto, exploration has been concentrated in supracrustal belts of the Slave Province, but the Nerak, Arcadia and Grumpy Lake showings suggest that areas underlain by plutonic rocks should not be ignored.




PROTEROZOIC

Hb — Gabbro sills and sheets. Includes Coronation and Franklin intrusions

RAE GROUP

RHssp3 — Shaly sandstone, siltstone, shale

RHssp2 — Red and green sandstone, mudstone

RHssp1 — Sandstone, siltstone, shale

RHs — Rae Group undivided

EPWORTH GROUP

EApw — Rocknest Fm: dolomite

EAc — Odjick Fm: sandstone, shale, mudstone

EAssp — Recluse Fm: argillite, shale, greywacke turbidites

COPPERMINE RIVER GROUP

CHvb — Copper Creek Fm: basaltic flows, minor sandstone

DISMAL LAKE GROUP

DHs — Dismal Lake Group undivided

ARCHEAN

Ag — Quartz diorite, granodiorite, quartz monzonite and granite. In part porphyritic. Granitic rocks undivided.

An — Granitic gneiss and migmatite and mixed gneisses involving Yellowknife Supergroup rocks.

YELLOWKNIFE SUPERGROUP

YAsdr — Cordierite-andalusite-bearing knotted schists and other metamorphic equivalents of Yellowknife Supergroup sedimentary rocks

YAvd — Felsic lava, tuff, agglomerate and ash flow tuff with minor undifferentiated mafic volcanic rocks

YAv — Volcanic rocks undivided

*FIGURE 8-21: Regional geology and properties of the Eokuk Inlier: NERAK 1-4 claims and grid area (geology from McGlynn, 1977).*

## POINT LAKE – ITCHEN LAKE CONTWOYTO LAKE METASEDIMENTARY BELT AND LUPIN MINE AREA

This belt of metasediments of the Contwoyto and the Itchen Formations (Bostock, 1980), describes a northward convex arc on the northern side of the Central Volcanic Belt (also known unofficially as the Olga Lake Volcanic Belt) (Figs. 8-22 and 8-28).

The Contwoyto Formation, which contains amphibolite (metamorphosed iron formation) zones and lenses, lies to the north, east and west of the Itchen Formation which generally contains no such amphibolite bodies. The areas underlain by Contwoyto Formation metasediments have been extensively staked for the gold potential of the amphibolite zones.

### VIN CLAIM

Terra Mines Ltd.
Suite 202,
7608-103rd St.
Edmonton, Alta., T6E 4Z8

Lead, Zinc, Copper
Silver, Gold
86 H/6
65°21'N, 113°07'W

#### REFERENCES

Bostock (1980); Jackson (1982, 1984, 1985); Schiller (1965); Seaton and Hurdle (1978).

DIAND assessment reports: 017344, 080563, 080564, 081861.

#### PROPERTY

VIN 1.

#### LOCATION

The claim is 330 km north-northeasterly from Yellowknife on the southern shore of the North Arm of Point Lake (Fig. 8-22).

#### HISTORY

The ground was first staked as CAM 1-10 in 1964 for Nahanni Mines Ltd. Point Prospecting Syndicate, an affiliate of Nahanni Mines, carried out prospecting and mapping at 1:6360. Three galena-pyrite showings were discovered in quartz veins along shear zones (Schiller, 1965; DIAND assessment report 017344).

In 1975, Texasgulf Inc. staked the area as the ROB and ROR claims. Two grids were set up over part of the claims; soil samples were analyzed for lead, zinc, copper and silver. Several copper-zinc anomalies and one copper anomaly were discovered (DIAND assessment reports 080563, 080564; Seaton and Hurdle, 1978).

#### DESCRIPTION

Regional geology is shown in Figure 8-22. The area is underlain by Archean mafic flows and turbiditic metasediments of the Point Lake and Contwoyto Formations respectively. A granitic/granodioritic pluton lies in the central portion of the claim (Fig. 8-23).

The area has been mapped at 1:250,000 by Bostock (1980) and at 1:31,680 and 1:30,000 by Jackson (1982, 1984, 1985).

#### CURRENT WORK AND RESULTS

The claim was geologically mapped at a scale of 1:6000. Over 140 rock samples were analyzed for lead, zinc, cobalt, copper, silver, gold, bismuth and nickel. Several samples, mainly in quartz veins and zones within altered, silicified and sheared tonalite, contain anomalous concentrations of lead, zinc, silver and gold. Sulphide minerals include sphalerite, galena, pyrite, chalcopyrite and locally, pyrrhotite and arsenopyrite.

A grid was set up over part of the claim and detailed geological mapping at 1:1200 and soil sampling were carried out. Analyses of over 650 soil samples for silver, copper, zinc and cobalt outlined several coincident anomalies.

### P CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101st.St
Edmonton, Alta., T5J 3S4

Gold
86 H/6,7
65°25'N, 113°00'W

#### REFERENCES

Bostock (1980); Henderson and Easton (1977a,b); Jackson (1982, 1984, 1985); Schiller (1965); Schiller and Hornbrook (1964); Seaton (1978); Seaton and Hurdle (1978).

DIAND assessment reports: 017343, 017345, 017346, 017348, 080464, 080527, 080560, 080561, 081840, 081850.

#### PROPERTY

P 1-20.

#### LOCATION

The claims are approximately 340 km north-northwesterly from Yellowknife between Itchen and Point Lakes (Fig. 8-22).

#### HISTORY

The area was first staked in 1963 and 1964 and formed part of the TREE, TESS, and PINE claim groups, Giant Yellowknife Mines; and the GREY and GORD groups, Point Prospecting Syndicate, an affiliate of Nahanni Mines Ltd. Work done on these claims included geological mapping, prospecting, trenching, magnetic and EM surveying and diamond drilling (DIAND assessment reports 017343, 017345, 017346, 017348; Schiller, 1965; Schiller and Hornbrook, 1964).

In 1975, the REN, RIS and FOG claims were staked for Texasgulf Inc. and covered part of the area that had been held as the GORD claims. An airborne EM survey was done in 1975. In 1975-76, soil sampling for copper, lead, zinc, silver and gold, and 838 m of diamond drilling were done (DIAND assessment reports 080464, 080527, 080560, 080561; Seaton 1978; Seaton and Hurdle, 1978).

In 1983, P 1-18 were staked by Trigg, Woollett Consulting Ltd. for Echo Bay Mines Ltd. P 19, 20 were staked in late

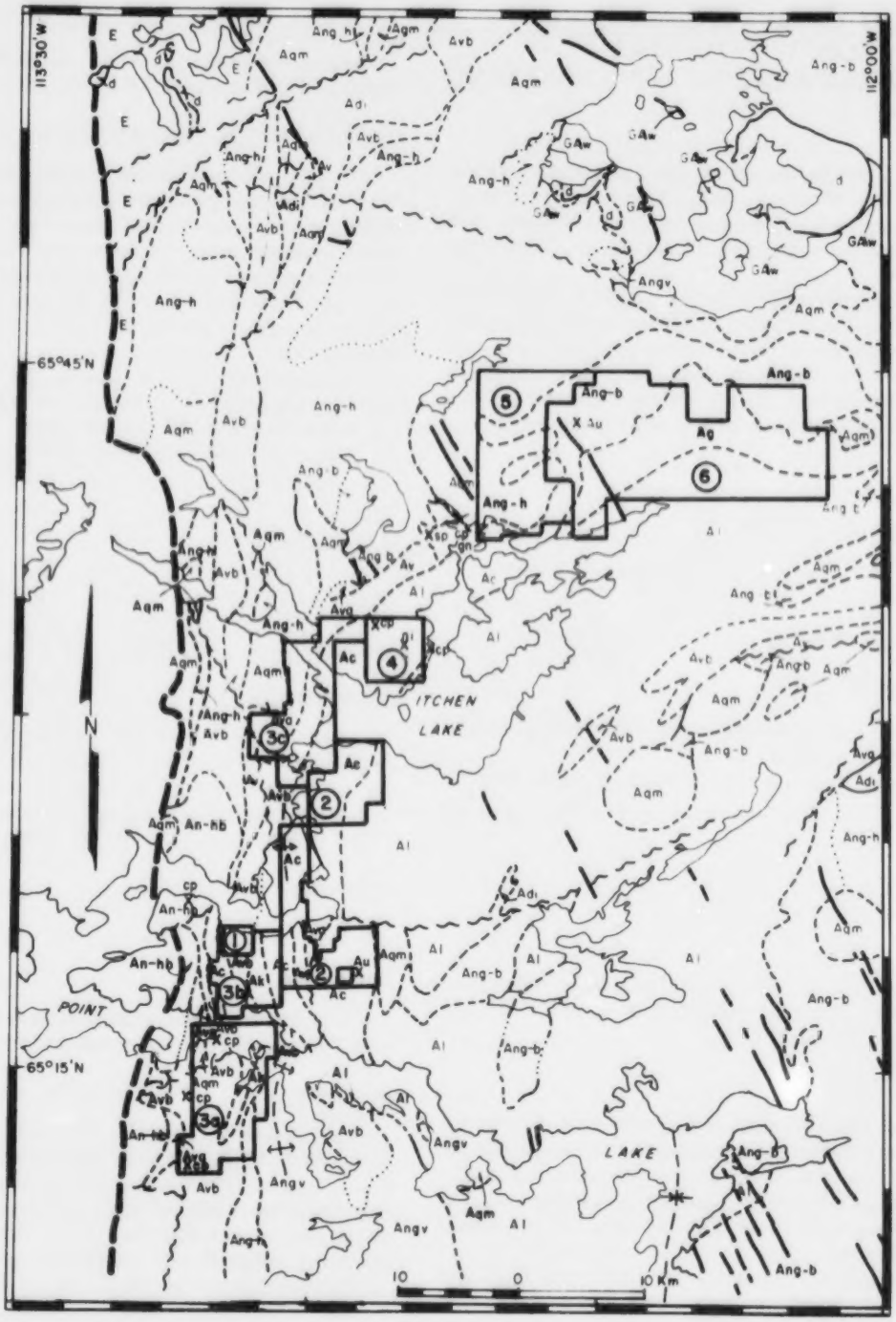
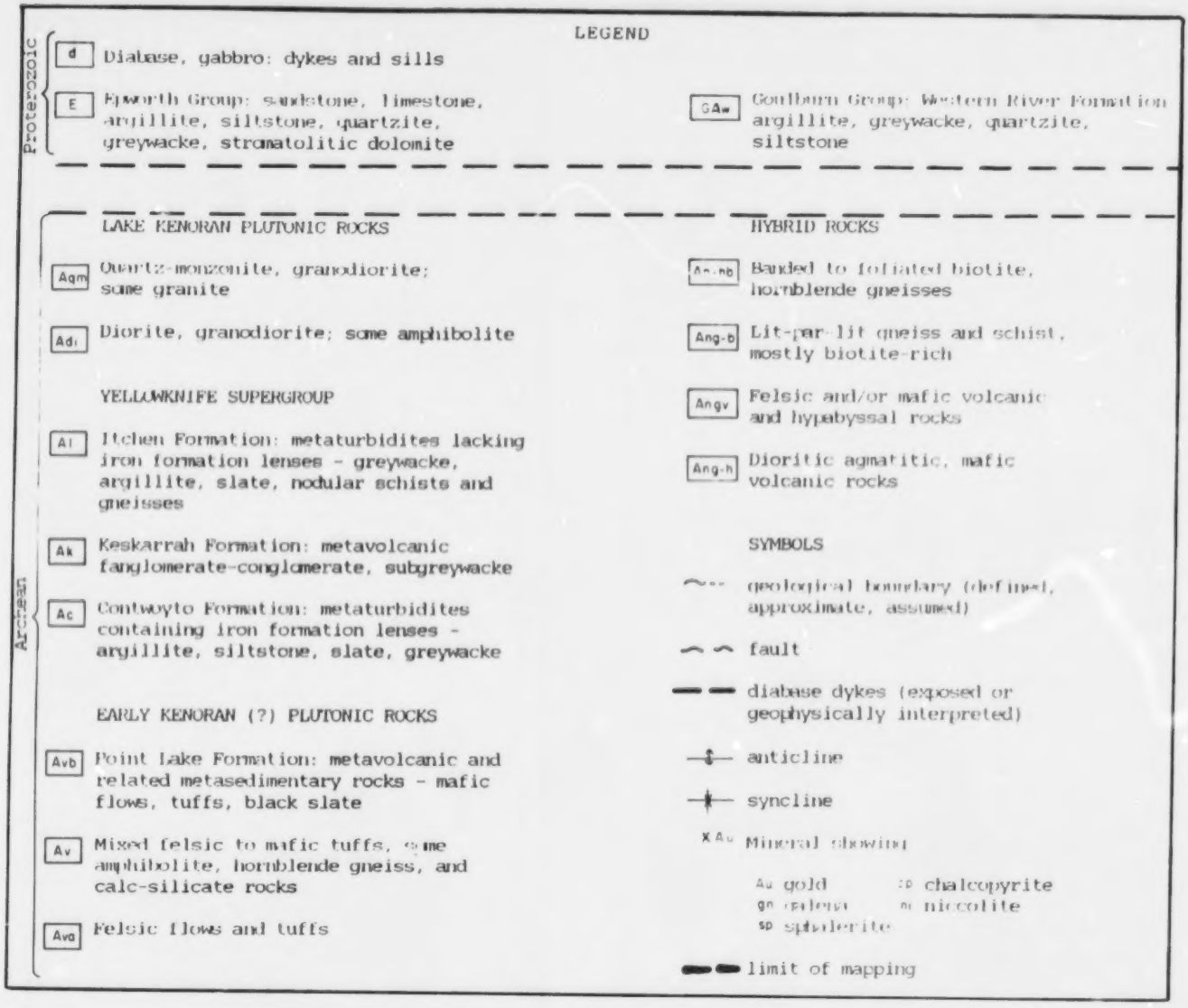



*FIGURE 8-22: Regional geology and properties of the Point Lake Supracrustal Belt (geology modified from Bostock, 1980).*




1984. The P claims surround Kidd Creek Mines Ltd.'s FOG 82, 88-95 and REN 38-46 and Giant Yellowknife Mines Ltd.'s TREE and TESS claims. P 4, 6, 7, 15-17 lapsed in July 1986.

## DESCRIPTION

The regional geology is shown in Figure 8-22; more detailed geology is shown in Figure 8-24. The area has been mapped by several geologists: Henderson and Easton (1977a,b) at 1:50,000; Bostock (1980) at 1:250,000; and Jackson (1982, 1984, 1985) at 1:31,680 and 1:30,000.

The area is predominantly underlain by metaturbidites of the Itchen and Contwoyto Formations. The Contwoyto Formation metasediments are interbedded with numerous lenses of silicate-, oxide- and carbonate-facies iron formation.

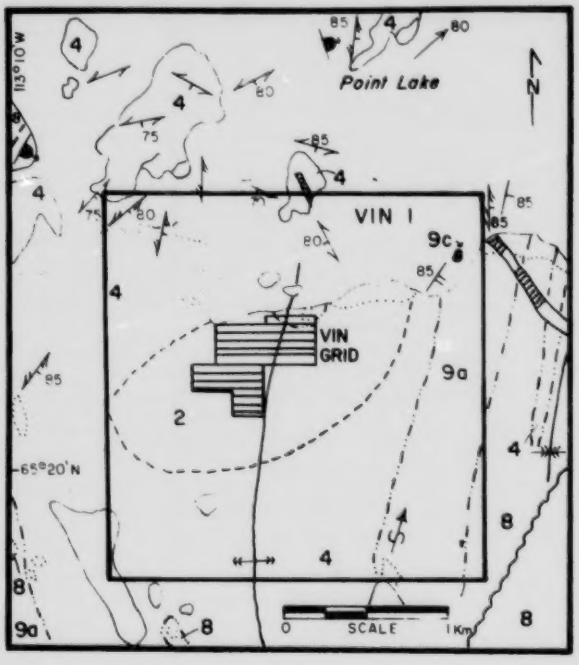
## CURRENT WORK AND RESULTS

Helicopter reconnaissance prospecting and mapping were done in 1983. Three gold showings in iron formation were discovered.

In 1984, prospecting and geological mapping were undertaken at 1:20,000 scale. Over 1500 samples were assayed for gold; 41 samples assayed greater than 2.00 g/t Au.

Five grids were set up on the claims (Fig. 8-24). Mapping at 1:500, and total field and vertical gradient magnetic, IP and VLF surveying were done on each grid. Both the magnetic and VLF surveys successfully traced iron formation in areas with overburden.

Two types of gold showings were discovered: one, hosted in sulphide-rich iron formation, similar to the type at Lupin, is believed to be syngenetic in origin; the other, in faulted




LEGEND

Diabase dykes: includes Proterozoic and older dykes

Archean

9 Contwoyto Formation: turbiditic sediments
9a low-grade sediments
9c iron formation

8 Keskarrah Formation: conglomerate and sandstone

4 Point Lake Formation: mafic flows

Unconformity

2 granite-granodiorite

SYMBOLS

bedding, tops unknown: inclined

pillows: tops known

S1: inclined, dip unknown

S2: inclined

minor fold axis (may include fold shape/ sense of asymmetry)

F2 axial trace: antiform, synform

area of outcrop

geological contact: observed, readily assumed, inferred

fault

*FIGURE 8-23: Geology of the VIN claim (geology from Jackson, 1982, 1985).*

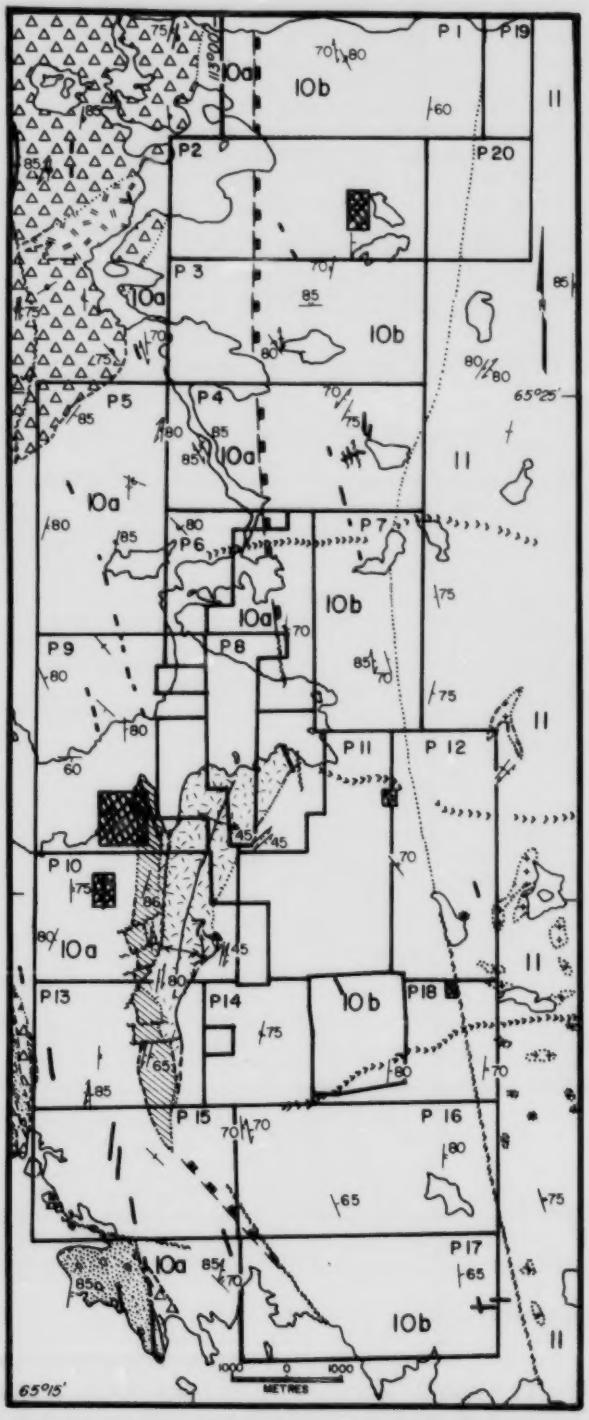
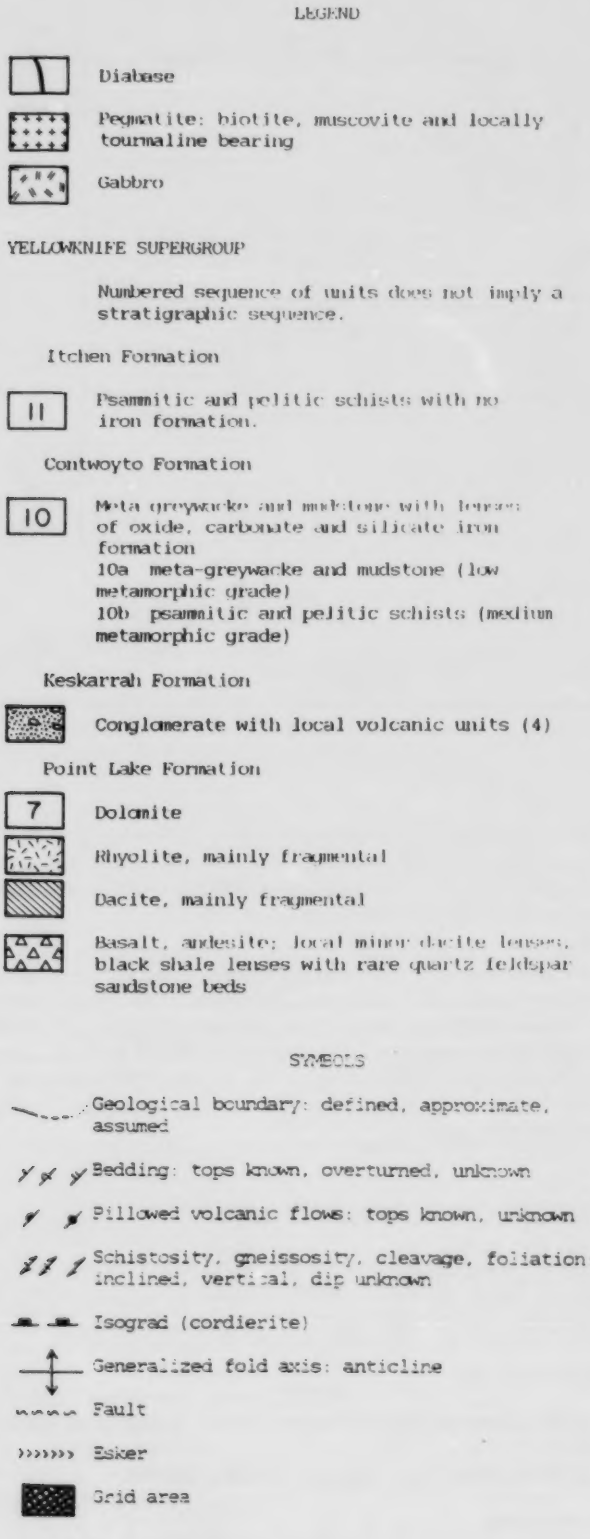



*FIGURE 8-24: Geology of the P claims (geology modified from Henderson and Easton, 1977a, and Jackson, 1982, 1985).*


LEGEND
Diabase
Pegmatite: biotite, muscovite and locally tourmaline bearing
Gabbro
YELLOWKNIFE SUPERGROUP
Numbered sequence of units does not imply a stratigraphic sequence.
Itchen Formation
11
Psammitic and pelitic schists with no iron formation.
Contwoyto Formation
10
Meta greywacke and mudstone with lenses of oxide, carbonate and silicate iron formation
10a meta-greywacke and mudstone (low metamorphic grade)
10b psammitic and pelitic schists (medium metamorphic grade)
Keskarrah Formation
Conglomerate with local volcanic units (4)
Point Lake Formation
7
Dolomite
Rhyolite, mainly fragmental
Dacite, mainly fragmental
Basalt, andesite; local minor dacite lenses, black shale lenses with rare quartz feldspar sandstone beds
SYMBOLS
Geological boundary: defined, approximate, assumed
Bedding: tops known, overturned, unknown
Pillowed volcanic flows: tops known, unknown
Schistosity, gneissosity, cleavage, foliation: inclined, vertical, dip unknown
Isograd (cordierite)
Generalized fold axis: anticline
Fault
Esker
Grid area

and folded lenses of oxide-carbonate facies iron formation, where gold, sulphides and arsenides have replaced part of the host rock, is epigenetic in origin.

## KAR, KES, MAX CLAIMS

| | |
|---|---|
| Noranda Exploration Company Ltd. 4-2130 Notre Dame Ave., Winnipeg, Man., R3H 0K1 | Gold, Silver, Base Metals 86 H/3,6,7,10,11 65°10'-65°29'N, 112°51'-113°15'W |

### REFERENCES

Bostock (1980); Henderson (1975a); and Henderson and Easton (1977a,b).

### PROPERTY

KAR 1-4; KES 3-9; MAX 1-8.

### LOCATION

The claims are 305 to 340 km north-northeasterly from Yellowknife. KES 3-9 are largely south of Point Lake. KAR 1-4 are mainly between the north and south arms of Point Lake. MAX 1-8 are roughly 12 km north of the KAR claim block and lie east of Itchen Lake.(Fig. 8-22).

### HISTORY

KAR 1-4, KES 3-9 and MAX 1-8 were recorded on September 18, 1985.

### DESCRIPTION

KES 3-9 are mainly underlain by mafic flows and tuffs of the Point Lake Formation. The Point Lake Formation is underlain, near the eastern margin of the KES 3-9 claim block, by conglomerate and lithic sandstone of the Keskarrah Formation. The conglomerate, which lies unconformably on pre-Yellowknife Supergroup granodiorite basement, contains both clasts of locally derived Yellowknife Supergroup volcanics and clasts of basement rocks (Henderson, 1975a; Henderson and Easton, 1977a,b).

KAR 1-4 are underlain by pre-Yellowknife Supergroup basement granodiorite on the south shore of the north arm of Point Lake. The basement is exposed in the core of an anticline. Other rocks exposed on the KAR claims are mafic flows and conglomerate of the Point Lake and Keskarrah Formations, psammitic and pelitic schists with oxide-, carbonate- and silicate-facies (locally sulphidic) iron formation of the Contwoyto Formation and, along the eastern margin, mixed gneisses, granite and pegmatite; in part, possibly older than granite and pegmatite; in part, possibly older than the Yellowknife Supergroup.

MAX 1-8 are underlain by volcanics of the Point Lake Formation (Western Volcanic Belt of Bostock, 1980) and metasediments of the Contwoyto Formation which flank them to the east.

### CURRENT WORK AND RESULTS

Following prospecting and reconnaissance geological mapping at 1:31,680, the KES, KAR and MAX claims were recorded.

## CUB CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101st St.
Edmonton, Alta., T5J 3S4

Gold
86 H/10
65°34'N, 112°52'W

### REFERENCES

Bau and others (1979); Bostock (1980); Schiller (1965); Schiller and Hornbrook (1964).

DIAND assessment reports: 017374, 017387, 081899.

### PROPERTY

CUB 1,2.

### LOCATION

The claims are 355 km north-northeasterly from Yellowknife on the west side of the central arm of Itchen Lake (Fig. 8-22).

### HISTORY

In 1963, the area was staked as the MAR claims for Robert's Mining Co. and air photo geology at 1:62,500 was done (DIAND assessment report 017374). In 1964, three showings were mapped, magnetically surveyed, trenched and sampled. Showings 2 and 3 are on the CUB claims. CUB 1, 2 were staked by Trigg, Woollett Consulting Ltd. for Echo Bay Mines Ltd. in 1983 and 1984 respectively.

### DESCRIPTION

The area was mapped by Bostock (1980) at 1:50,000 and Bau and others (1979) at 1:31,680. Regional and claim geology are shown in Figures 8-22 and 8-25.

The claims are predominantly underlain by knotted quartz-feldspar-biotite schists of the Contwoyto Formation, intercalated with lenses of iron formation. Two showings, mapped in 1964 by Robert's Mining Co., are on the CUB claims (Fig. 8-25).

Showing 2 is a mineralized, sheared, recrystallized, micaceous quartzite near the contact with a gabbro. Minerals include nickeliferous pyrrhotite, chalcopyrite, niccolite, gersdorffite, annabergite, and minor native copper, galena and pyrite. Assays ranged up to 11.66 g/t Au, 4% Cu and 7.5% Ni.

Showing 3 is a mineralized iron formation. Samples from trenches assayed up to 14.74 g/t Au (DIAND assessment report 017387; Schiller and Hornbrook, 1964; Schiller, 1965).

### CURRENT WORK AND RESULTS

**1983:**

CUB 1 was mapped at 1:2000 and prospected. Over 200 grab samples analyzed for gold had varying results. Two gold showings in iron formation were discovered.

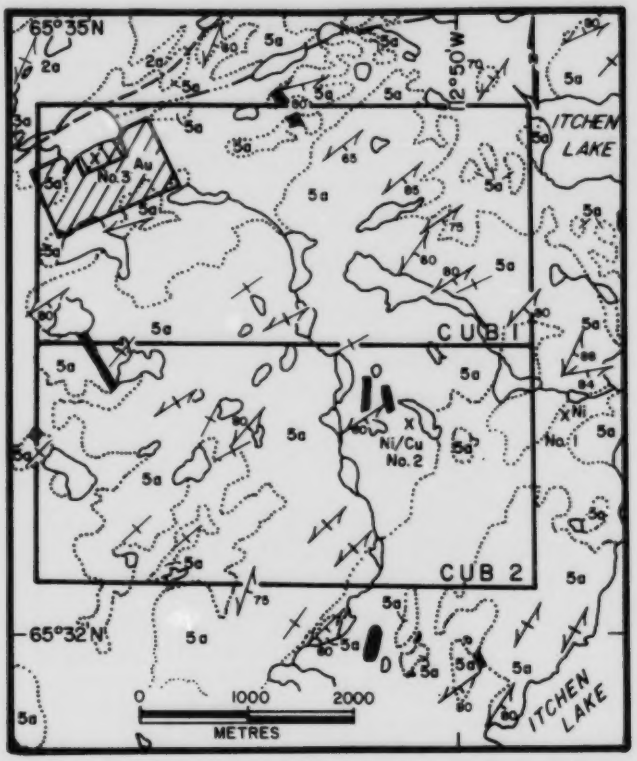



*FIGURE 8-25: Geology of the CUB claims (geology modified from Bau and others, 1979; showing locations from DIAND assessment report 017387).*

A magnetic survey was done over a 23 line km grid (Fig. 8-25). One northeast-trending anomaly, that coincides with a silicate facies iron formation, is possibly due to the presence of magnetite or pyrrhotite.

**1984:**

Prospecting and mapping continued on CUB 1 and was begun on the CUB 2 area (then unstaked). CUB 2 was staked in August 1984 to cover four gold occurrences. Detailed magnetic surveying and mapping were carried out over one gold showing on CUB 1 (Fig. 8-25). A total of 597 samples, taken from sulphide-silicate facies iron formation, were assayed for gold.

## PROSPECTING PERMIT 1074

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101st St.
Edmonton, Alta., T5J 3S4

Gold
86 H/10
65°37'30"N-65°45"N,
112°30'W-112°45'W

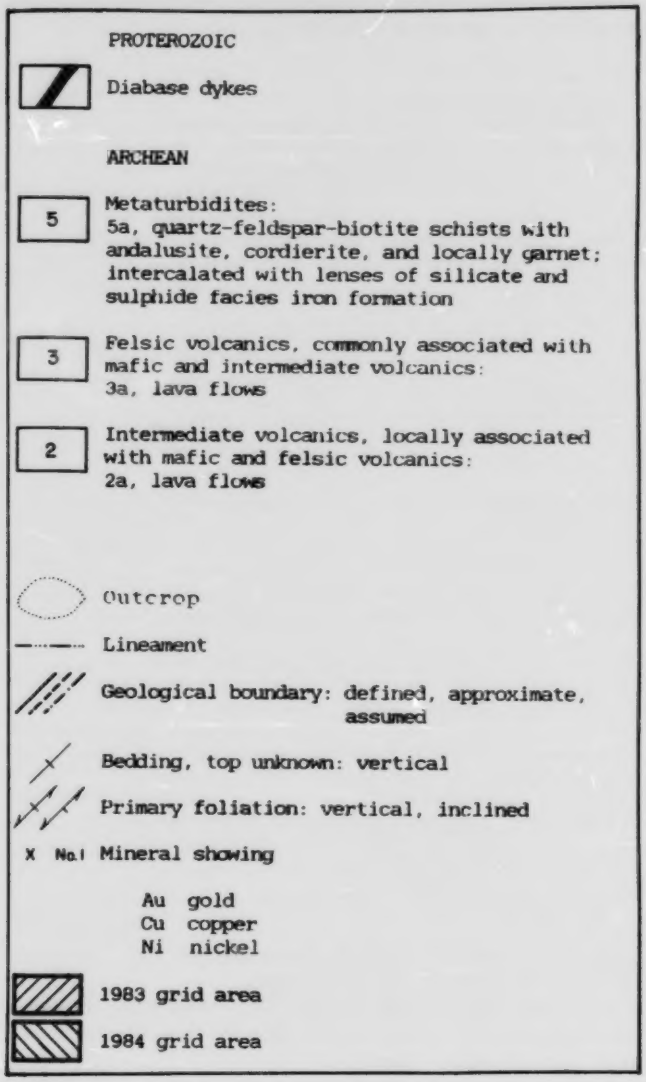
### REFERENCES

Bau and others (1979); Bostock (1980); Seaton and Hurdle (1978).

DIAND assessment reports: 080585, 081968.

### PROPERTY

Prospecting Permit 1074.




## LOCATION

The permit is 370 km north-northeasterly from Yellowknife (Fig. 8-22).

## HISTORY

The permit covers ground previously explored by Noranda Exploration Co. Ltd. The southwest corner of the permit was staked as the BOW claims in August 1975. In 1976, Noranda mapped and prospected the claims; airborne magnetic and Input EM surveys were also flown (Seaton and Hurdle, 1978; DIAND assessment report 080585).

The prospecting permit was granted to Echo Bay Mines Ltd. in February 1985.

## DESCRIPTION

The area is underlain by Archean Contwoyto Formation metasediments, quartz monzonite and lit-par-lit gneisses (Bostock, 1980). The regional and more detailed geology of the permit area is shown in Figures 8-22 and 8-26. Bau and others (1979) and Bostock (1980) mapped the area at 1:31,680 and 1:50,000 respectively.

## CURRENT WORK AND RESULTS

Helicopter-borne total field magnetic, VLF and EM surveys were flown. Two areas with coincident magnetic and VLF anomalies were outlined and are possible extensions of iron formation to the east of the permit.

# F, SIK, SKI CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180-101st St.
Edmonton, Alta., T5J 3S4

Gold
86 H/9,10,15,16
65°42'N, 112°22'W

## REFERENCES

Bau and others (1978, 1979); Bostock (1980); Padgham and others (1975); Schiller (1965); Schiller and Hornbrook (1964).

DIAND assessment reports: 017345, 017347, 017338, 017439, 081800, 081865, 082050.

## PROPERTY

F 1-24; SIK 1; SKI 1.

## LOCATION

The claims are approximately 375 km north-northeasterly from Yellowknife, to the northeast of Itchen Lake (Fig. 8-22).

## HISTORY

The area was staked in 1962 and 1963, but most of the claims were dropped in 1964. Work done on these claims in 1963 is summarized in Table 8-2. In 1972, the ASP claims were staked, over the area now held as F 5, by G. Braden for Shield Resources Ltd. (historical DIAND claim maps; Padgham and others, 1975). Magnetic surveying and trenching were apparently done (DIAND assessment report 081865), but no assessment report was filed.

The SIK, SKI and F claims were staked by Trigg, Woollett Consulting Ltd. for Echo Bay Mines Ltd. in 1981 and 1983. F 16, 17 lapsed in August 1985.

## DESCRIPTION

The area has been mapped by Bau and others (1978, 1979) at 1:31,680 and by Bostock (1980) at 1:250,000.

The area is underlain predominantly by Contwoyto Formation metaturbidites, with intercalated lenses of iron formation, and by Itchen Formation metaturbidites (Fig. 8-27). The contact between the Contwoyto and Itchen Formations is in the southern part of the claim group, through F 19, 23, SIK 1, F 2,5,8, and 11. The northern claims are underlain mainly by lit-par-lit gneisses and Contwoyto Formation rocks. Both the Contwoyto and Itchen Formation rocks are intruded by small bodies of granitic rocks and northwesterly trending diabase dykes.

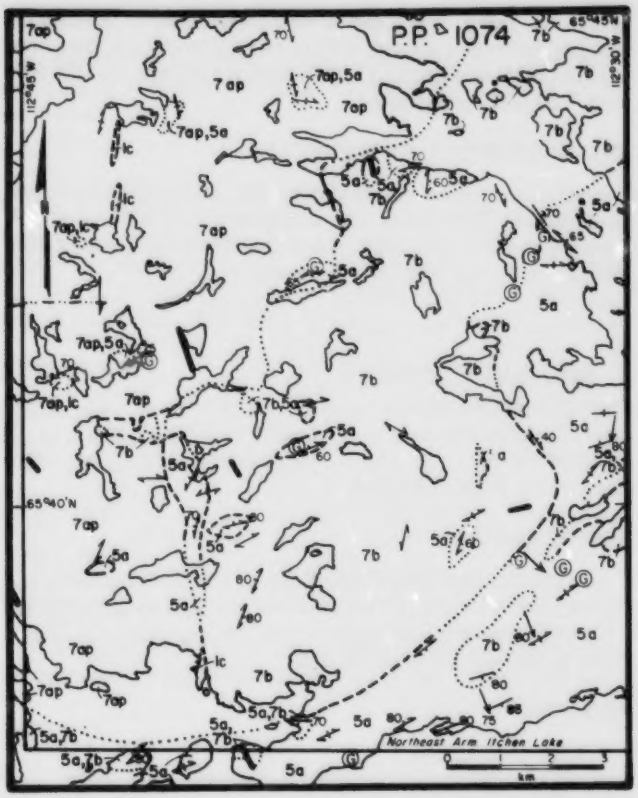



*FIGURE 8-26: Geology of Prospecting Permit 1074 (geology modified from Bau and others, 1979).*

LEGEND

Diabase dykes

7 Felsic plutonic rocks:
7ap, porphyritic granite, locally with inclusions of metavolcanics, metasediments and diorite; 7b, granodiorite, locally pegmatitic and with inclusions of quartz-feldspar-biotite schists

5 Metaturbidites:
5a, quartz-feldspar-biotite schists with andalusite, cordierite, and locally garnet.

1 Mafic volcanics, locally associated with intermediate and felsic volcanics:
1c, amphibolites

Symbols

Lineament

Geological boundary: defined, approximate, assumed

Bedding, top unknown: vertical, inclined

Bedding, top known (arrow): inclined

Primary foliation: vertical, inclined, dip unknown

Mineral lineation with plunge

(G) Gossan

Gold is in silicate-sulphide facies iron formation lenses and is associated with arsenopyrite, pyrrhotite and loellingite (Bostock, 1980). It is usually concentrated at the nose or along the limbs of folds.

## CURRENT WORK AND RESULTS

**1983:**

Detailed mapping at 1:2000 scale, prospecting and trenching were done over SIK 1 and SKI 1. Magnetic surveys were done on the SKI 1 and SIK 1 grids (Fig. 8-27). Five trenches on each claim were blasted in iron formation and samples assayed for gold.

Reconnaissance geological mapping and prospecting were done on the F claims. Numerous gold showings were discovered, warranting further detailed work.

**1984:**

Gold showings discovered in 1983 were mapped in detail. Over 3000 grab samples of iron formation were assayed for gold. Anomalous gold values averaged between 2.0 and 5.0 g/t Au; several samples had assays of greater than 10.0 g/t Au. Mapping and prospecting at 1:50,000 continued. One trench was blasted on F5.

**1985:**

Various parts of the claims were mapped at 1:5000, 1:1000 and 1:500. Fourteen trenches were blasted. Chip samples assayed for gold gave varying results.

Four diamond drill holes totalling 293 m were drilled through iron formation on F 5. Samples gave low gold assays over less than mineable widths.

VLF and magnetic surveying were done on the F 5, R 66, R 72 and Iyama Lake grids (Fig. 8-27). Most magnetic anomalies are due to magnetic iron formation or diabase dykes.

Airborne EM, magnetic and VLF surveys were conducted over some of the F claims (Fig. 8-27). An EM survey outlined numerous bedrock conductors, possibly indicative of sulphide-enriched zones in iron formation. Possible extensions of known iron formation were indicated by magnetic anomalies. Numerous VLF conductors were outlined and are believed to indicate zones of sulphide-bearing iron formation.

*TABLE 8-2: WORK ON GROUND NOW HELD AS THE F, SIK AND SKI CLAIMS*

| Previous Claim Group | Owner | Work Done | References | Present Claim |
|---|---|---|---|---|
| AA | July 1963: staked by G. Turner & N. Avadluk; optioned to Roberts Mining Co.; dropped Aug. 1963 Sept. 1963 restaked & optioned to Giant Yellowknife Mines Ltd. | 6 holes (417 m); trace to minor gold; best grab sample: 0.93 oz/T Au | 017439; Schiller and Hornbrook, 1964; Schiller, 1965 | F 12, 16 |
| BAT | 1963: staked by R. Beck; optioned to Giant Yellowknife Mines Ltd.; dropped 1963 | mapping, sampling, gold panning EM & magnetic surveys; grab sample: 0.06 oz/T Au | 017345; Schiller and Hornbrook, 1964 | F 7, 9, 10, 13, 14 |
| CAT | 1963: staked by G. Turner | none | Schiller and Hornbrook, 1964; | F 3, 6, 9 |
| FUZ | 1962: staked by Canadian nickel Co. Ltd. | prospecting, mapping, magnetic survey and trenching; 6 holes (456 m); 0.36 oz/T Au | Schiller and Hornbrook, 1964; 017347 | F 7, 8, 10, 11, 14, 15, 18-24 SIK 1, SKI 1 |
| GET | 1963: staked by N. Advadluk | none | Schiller and Hornbrook, 1964 | F 13, 14, 18 |
| PIT | 1963: staked by Roberts Mining Co. | mapping, detailed examination of iron formations | Schiller and Hornbrook, 1964; 017388 | F 4, 5, 7, 8 |
| TEG | staked in 1963 | none | Schiller and Hornbrook, 1964 | F 9, 13, 17 |
| WO | 1963: staked; optioned to Giant Yellowknife Mines Ltd.; dropped Sept. 1963 | sampling, mapping | 017345; Schiller and Hornbrook, 1964 | F 3, 14 |

## C CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180 - 101st St.
Edmonton, Alta., T5J 3S4

Gold
76 E/9,10,15
C1: 65°53'N, 110°40'W
C2-4: 65°46'N, 110°34'W

### REFERENCES

Fraser (1964).

DIAND assessment reports: 017119, 017120, 017154, 017156, 017162, 017167, 081864.

### PROPERTY

C 1-4.

### LOCATION

C 1 and C 2-4 are 425 km and 415 km northeasterly from Yellowknife respectively, to the north of Contwoyto Lake.

### HISTORY

In 1962, Prospecting Permits 33 and 35 (PP 76-E-10, PP 76-E-15) covered ground now staked as the C claims. The permits were granted to Canadian Nickel Company Ltd. who conducted airborne and ground magnetic surveys, mapping at 1:31,680 scale, detailed and reconnaissance prospecting and diamond drilling from 1962 to 1964. Several gold showings containing up to 5.83 g/t Au were discovered. The permits lapsed in 1964 (DIAND assessment reports 017119, 017120, 017154, 017156, 017162, 017167). No work was recorded for this area between 1964 and 1983, when C 1-4 were staked for Echo Bay Mines Ltd.

### DESCRIPTION

Regional and claim geology are shown in Figures 8-28 and 8-29. The area was mapped by Fraser (1964) at 1:506,880.

C 1 is underlain by Archean metaturbidites of the Contwoyto Formation and intruded by Late Kenoran quartz monzonite and granodiorite. C 2-4 areas are underlain by undivided metaturbidites of the Contwoyto and Itchen Formations, mainly knotted biotite schists. Silicate-facies iron formation lenses are interbedded with the Contwoyto Formation metasediments.

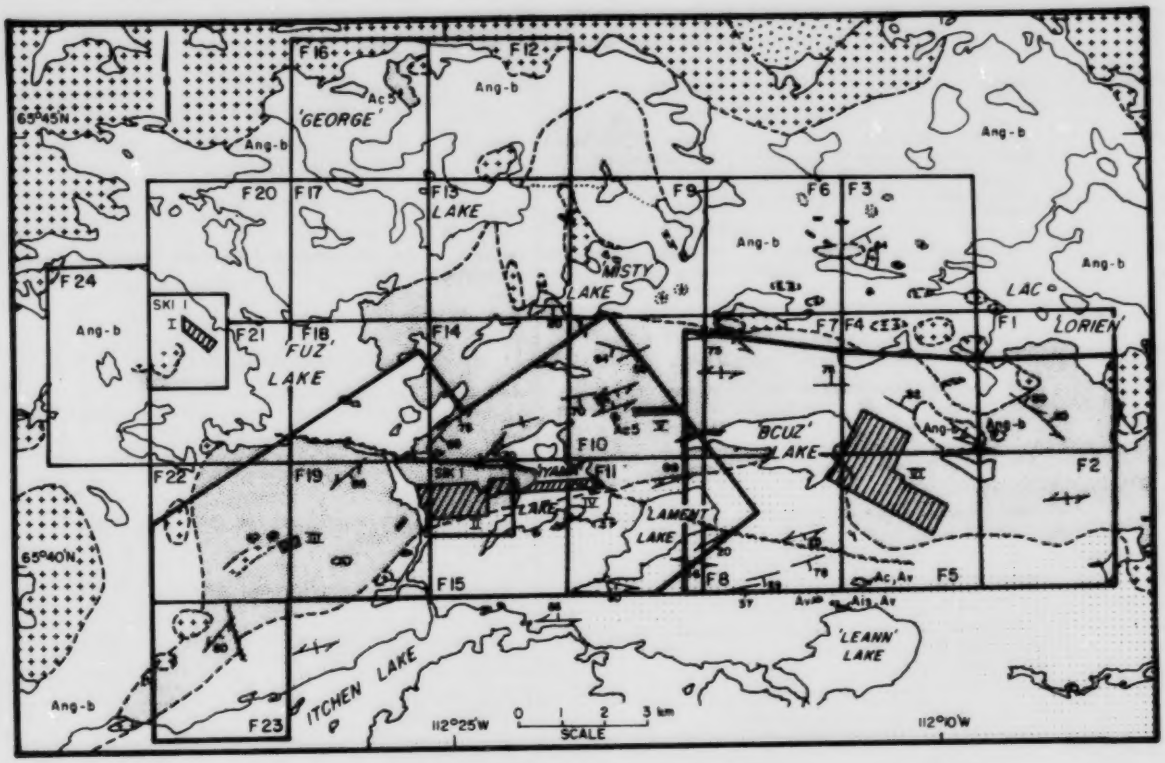
### CURRENT WORK AND RESULTS

**1983:**

The claims were prospected and mapped on reconnaissance scale. Over 475 samples were assayed for gold. Eight gold showings (assays greater than 2.9 g/t Au) were discovered, all in silicate-facies iron formation, with or without sulphides.

**1984:**

Gold showings on C 2 were evaluated and further mapped and prospected. All samples assayed less than 2.00 g/t Au.




LEGEND

PROTEROZOIC

HELIKIAN

— Diabase

ARCHEAN

LATE KENORAN PLUTONIC ROCKS

Quartz monzonite, granodiorite; some granite

HYBRID ROCKS
(Yellowknife Supergroup and late Kenoran diorite, granodiorite intruded by granitic rocks)

Ang-b — Lit-par-lit gneisses; biotite schists with iron formation lenses; granitic rocks containing "rafts" of metasedimentary rocks including iron formation

Felsic and/or mafic volcanic and hypabyssal rocks, some granitic gneisses intruded by Aqm

YELLOWKNIFE SUPERGROUP

ITCHEN FORMATION (metaturbidites lacking iron formation lenses): nodular quartz-plagioclase-biotite schist and gneiss, greywacke

CONTWOYTO FORMATION (metasedimentary rocks containing iron formation lenses): primarily nodular quartz-mica schist with lenses of silicate- and sulphide-facies iron formation and minor oxide-facies iron formation
Ac5: phyllite, greywacke

EARLY KENORAN (?) PLUTONIC ROCKS

Av — Mixed felsic to mafic tuffs

SYMBOLS

Geological contact: approximate, assumed

Outcrop

Bedding: inclined, vertical

Schistosity: inclined, vertical

Fault

Area covered by grid:
I SKI 1 grid
II SIK 1 grid
III R72 grid
IV Iyama Lake grid
V R66 grid
VI F5 grid

*FIGURE 8-27: Geology of the F, SIK and SKI claims. 1983 to 1985 grids are shown.*

## DLER, JOHN, SHIN CLAIMS

Hecla Mining Company
of Canada Ltd.
P.O. Box 49200
Bentall Postal Station
Vancouver, B.C., V7X 1L1

Gold
76 E/10,14-16
65°44'22"-65°54'28"N,
110°29'38"-111°00'04"W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).
DIAND assessment reports: 017119, 017120, 017154, 017156, 017162, 017167, 081974.

### PROPERTY

DLER 1-4; JOHN 2-7, 8-12; SHIN 1-19.

### LOCATION

The claims are 390 km northeasterly from Yellowknife (Fig. 8-28).

### HISTORY

The claims cover ground formerly held as Permits 33 (PP 76-E-10) and 35 (PP 76-E-15) by Canadian Nickel Company Ltd. from 1962 to 1964. An airborne magnetic survey was flown, and followed-up with detailed ground magnetic surveying and mapping (DIAND assessment reports 017119, 017120, 017154, 017156, 017162, 017167). The permits lapsed in 1964.

The SHIN claims were recorded in November, 1983; JOHN 1-7 in December 1984; JOHN 8-12 and DLER 1-4 in January 1985. They were subsequently transferred to Schindler Exploration Consultants Ltd., 305314 Alberta Ltd. and finally to Hecla Mining Company in July 1985.

### DESCRIPTION

The area is underlain predominantly by Archean metasediments with intercalated iron formation lenses of the Contwoyto Formation, intruded by granitic dykes and plutons and diabase dykes.

Fraser (1964), Tremblay (1976) and Bostock (1980) mapped the area at 1:506,880, 1:50,000 and 1:250,000 scales respectively. The regional and claim geology are shown in Figures 8-28 and 8-29.

### CURRENT WORK AND RESULTS

In 1985, helicopter-borne EM, magnetic and VLF surveys were flown over the DLER, JOHN 8-12, SHIN and JOHN 2-7 claims (3547 line km). A few moderate conductors were detected on the DLER, JOHN 8-12 and SHIN claims. Results of the survey over JOHN 2-7 were not received in time for this report.

## AU 10, 13, 16, 27 CLAIMS

Bow Valley Industries Ltd.
2020-1177 W.
Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/10,11
65°40'30"N, 111°04'W

### REFERENCES

Bostock (1980); Seaton and Crux (1985); Tremblay (1976).
DIAND assessment reports: 081739, 081859.

### PROPERTY

AU 10, 13, 16, 27.

### LOCATION

The claims are 395 km northeasterly from Yellowknife, and include most of Shallow Bay on the west side of Contwoyto Lake (Figs. 8-28, 8-30).

### HISTORY

The exploration history of the area from 1960 to 1981 is summarized in Seaton and Crux (1985).

AU 10, 13, 16 and 27 were recorded in February 1981 for Hemisphere Development Corporation. Work done in 1983 included mapping and geophysical surveying (DIAND assessment report 081739; Seaton and Crux, 1985). The claims were optioned to Bow Valley Industries Ltd. in May 1984.

### DESCRIPTION

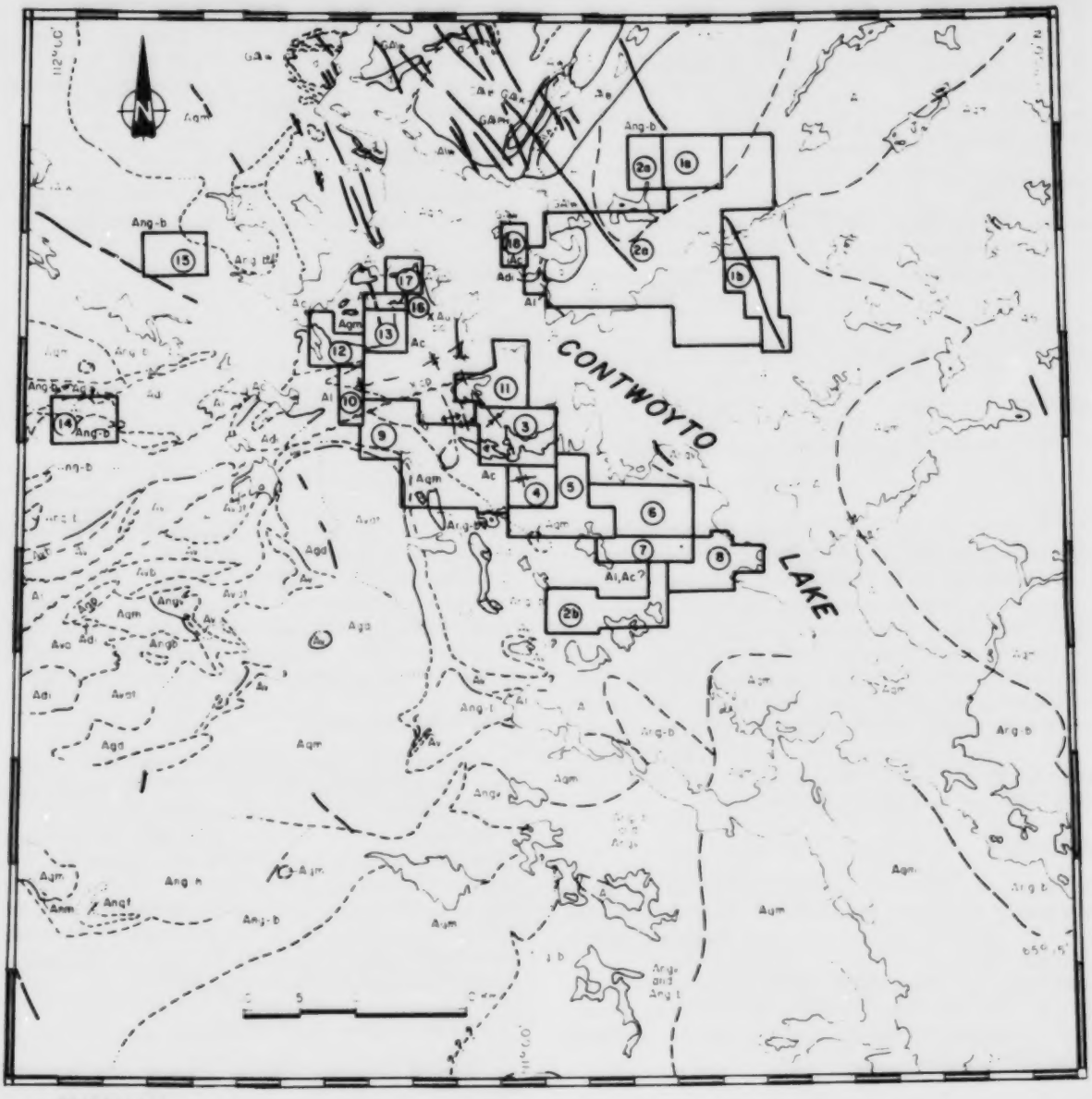
Figures 8-28 and 8-30 show the regional geology of the area. Bostock (1980) and Tremblay (1976) mapped the area at 1:250,000 and 1:50,000 respectively.

The claims are underlain by Archean Yellowknife Supergroup metasediments, interbedded with silicate- and sulphide-facies iron formation, and minor intermediate volcaniclastics. A large syncline with a north-northwesterly trending fold axis extends through AU 10, 13, 14. Numerous northwesterly and north-northwesterly trending Proterozoic diabase dykes intrude the metasediments (Fig. 8-30).

### CURRENT WORK AND RESULTS

In 1983, mapping and VLF-EM and magnetic surveying were done on Grids H-2, H-3 and H-4. In 1984, grid H-4 was extended to the south, east and north. In all, 279.86 line km of new grids were established and mapping and geophysical surveying were done over most of these. Five holes totalling 438.3 m were diamond drilled.

Work completed during the 1984 field season is summarized in Table 8-3.




PROPERTIES

| | | |
|---|---|---|
| (1a) C 1 | (6) AU 23,24; KEG 1,2 | (13) WEST |
| (1b) C 2-4 | (7) NC 1; PTC 1 | (14) SHARE |
| (2a) DLER 1-4; JOHN 8-12; SHIN 1-19 | (8) CTL 1; DIGGER 1,2; SAM 1,2 | (15) RAFT |
| (2b) JOHN 2-7 | (9) AU 4,5,7,11; BARB 1; KAP 1-3; MINER | (16) WHY |
| (3) AU 10,13,16,27 | (10) PIXIE | (17) AU 1 |
| (4) AU 14,17 | (11) AU 6,8,9,12 | (18) GOLD 1 |
| (5) AU 15,18,19 | (12) AU 2,3 | |

*FIGURE 8-28: Regional geology and properties of the Contwoyto Lake (Olga Lake) Supracrustal Belt (geology modified from Bostock, 1980), Tremblay, 1976) and Fraser, 1964).*

## LEGEND

d — Diabase, gabbro; dykes and sills.

GOULBURN GROUP

GAK — KUUVIK FORMATION: limy and dolomitic rocks; minor siliceous and argillaceous material.

GAPH — PEACOCK HILLS FORMATION: red, grey, green and black argillites; pink quartzite.

GAB — BURNSIDE RIVER FORMATION: pink quartzite; minor quartz-pebble conglomerate; white quartzite

GAW — WESTERN RIVER FORMATION: argillite, greywacke, quartzite, siltstone.

LATE KENORAN PLUTONIC ROCKS

Aqm — Quartz-monzonite, granodiorite; some granite;

Adi — Diorite, granodiorite; some amphibolite;

YELLOWKNIFE SUPERGROUP

Ai — ITCHEN FORMATION: metaturbidites lacking iron-formation lenses.

Ac — CONTWOYTO FORMATION: metaturbidites containing iron-formation lenses - argillite, siltstone, slate, greywacke.

EARLY KENORAN (?) PLUTONIC ROCKS

Agd — Granodiorite, quartz diorite, quartz-monzonite.

Aqp — Quartz porphyry.

Avb — POINT LAKE FORMATION: metavolcanic and related metasedimentary rocks tuffs, black slate.

Av — Mixed felsic to mafic tuffs; some amphibolite, hornblende gneiss, and calc-silicate rocks.

Avq — Felsic flows and tuffs.

Avqt — Felsic tuffs; some felsic flows; includes mylonitized felsic rocks, possible felsic tuffs.

HYBRID ROCKS:

Ang-b — Lit-par-lit gneiss and schist mostly biotite-rich.

Angv — Felsic and/or mafic volcanic and hypabyssal rocks.

Ang-h — Diorite agmatitic, mafic volcanic rocks.

Anm — Hornblende gneiss, amphibolite intruded by Aqm.

Anqf — Quartz-feldspar gneiss.

SYMBOLS

Geological boundary (defined, approximate, assumed).

Fault.

Diabase dykes (exposed or geophysically interpreted).

Anticline.

Syncline.

XAu — Mineral occurrence:
Au gold cp chalcopyrite.
po pyrrhotite.

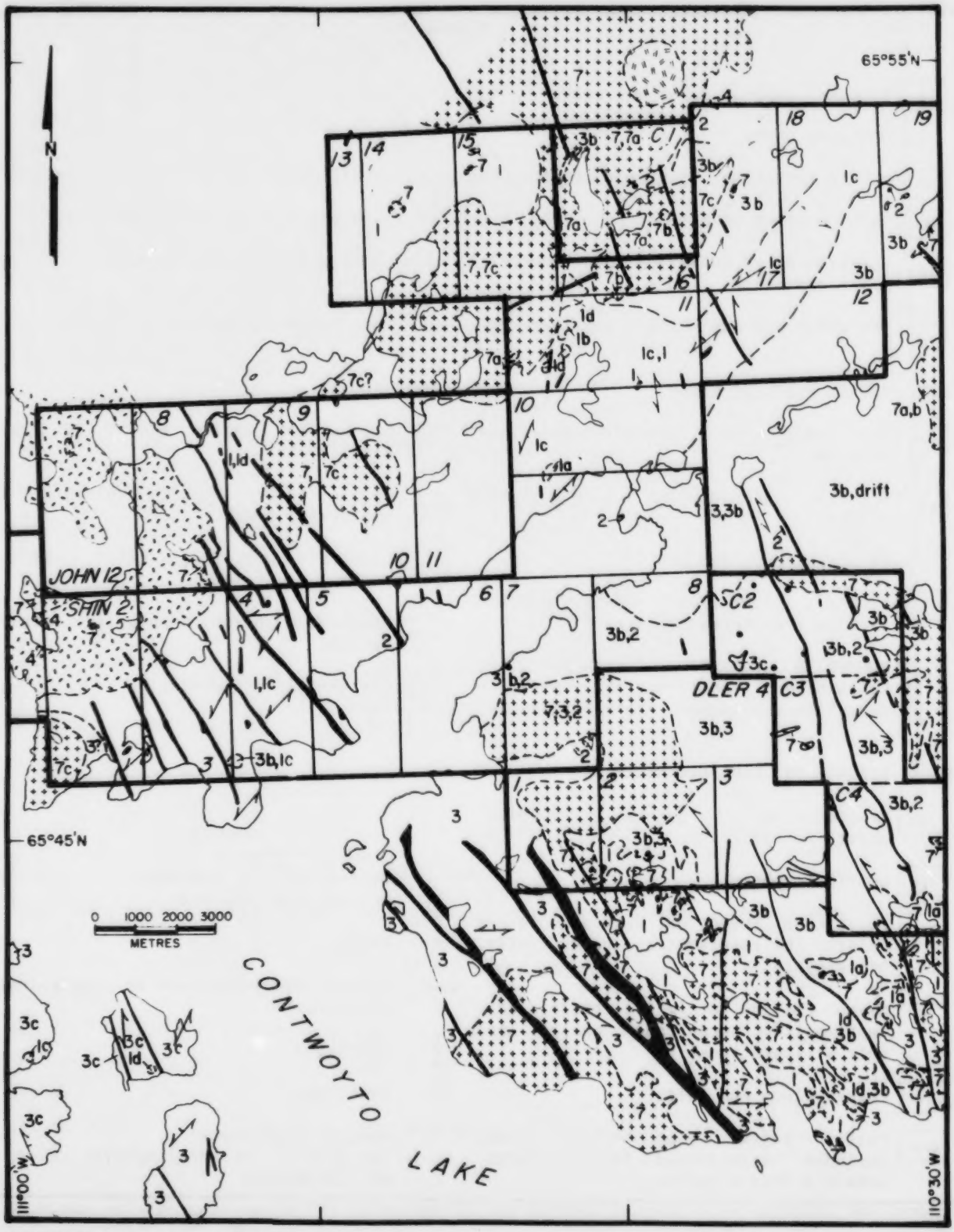
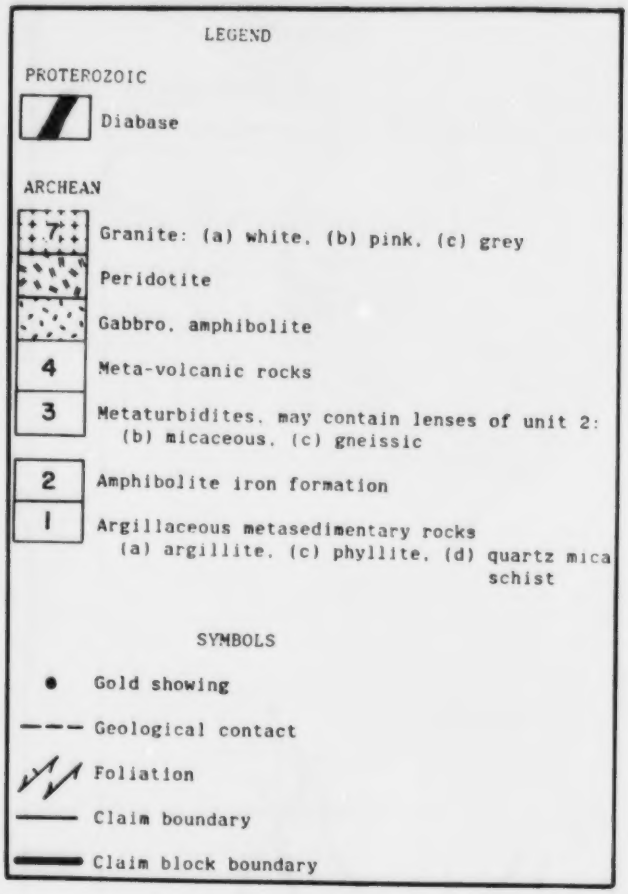



*FIGURE 8-29: Geology of the C, DLER, JOHN and SHIN claims and gold showing locations (geology modified from DIAND assessment report 017207).*




## AU 14, 17 CLAIMS

Bow Valley Industries Ltd.
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/10,11
65°38'N, 111°01'W

### REFERENCES

Bostock (1980); Fraser (1964); Schiller (1965); Seaton and Crux (1985); Tremblay (1976).

DIAND assessment reports: 017167, 081737, 081838

### PROPERTY

AU 14, 17.

### LOCATION

The claims are 390 km northeasterly from Yellowknife, 3 km south of Shallow Bay on the west side of Contwoyto Lake (Figs. 8-28, 8-30).

### HISTORY

The exploration history of the area is described in Seaton and Crux (1985).

The claims were recorded in February 1981 for Viscount Resources Ltd. In 1983, the claims were mapped and geophysically surveyed (DIAND assessment report 081737; Seaton and Crux, 1985), and optioned to Bow Valley Industries Ltd. in December.

### DESCRIPTION

The regional geology is shown in Figures 8-28 and 8-30. The area around the claim was mapped by Tremblay (1976) at 1:50,000, Fraser (1964) at 1:506,880, and in part by Bostock (1980) at 1:250,000,

The claims are underlain by Archean Yellowknife Supergroup metasediments, interbedded with silicate- and sulphide-facies iron formation, and minor intermediate volcaniclastics.

### CURRENT WORK AND RESULTS

In 1984, mapping, geophysical surveying and diamond drilling were done.

Three grids were constructed on the claims in 1984: V-3 grid (88.2 line km on AU 14,17), part of the V-4 grid (19.76 line km on AU 17) and part of the SB-2 grid (9 line km on AU 14).

Geological mapping, total field and vertical gradient magnetic and VLF surveying at 1:2000 scale were conducted over each grid. Mapping was not completed on the V-4 grid. The results of the surveys are shown in Table 8-4.

## AU 15, 18, 19 CLAIMS

Cominco Ltd.
Suite 700, 409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 E/10,11
65°36'N, 111°00'W

### REFERENCES

Bostock (1980); Fraser (1964); Seaton and Crux (1985); Tremblay (1976).

DIAND assessment reports: 081735, 081870, 081951, 081952.

### PROPERTY

AU 15, 18, 19.

### LOCATION

The claims are 390 km northeasterly from Yellowknife and south of Shallow Bay in the Contwoyto Lake area (Figs. 8-28, 8-31).

### HISTORY

The exploration history of the AU 15 area, including work done during 1983 (DIAND assessment report 081735), is summarized in Seaton and Crux (1985).

The claims were recorded in February, 1981 and were explored in 1984 by Amhawk Resources Corporation by agreement with the Kanwood Syndicate. The claims were optioned from Amhawk Resources to Cominco Ltd. in 1985.

### DESCRIPTION

The regional geology is shown in Figures 8-28 and 8-31. The area has been mapped at 1:250,000 by Bostock (1980),

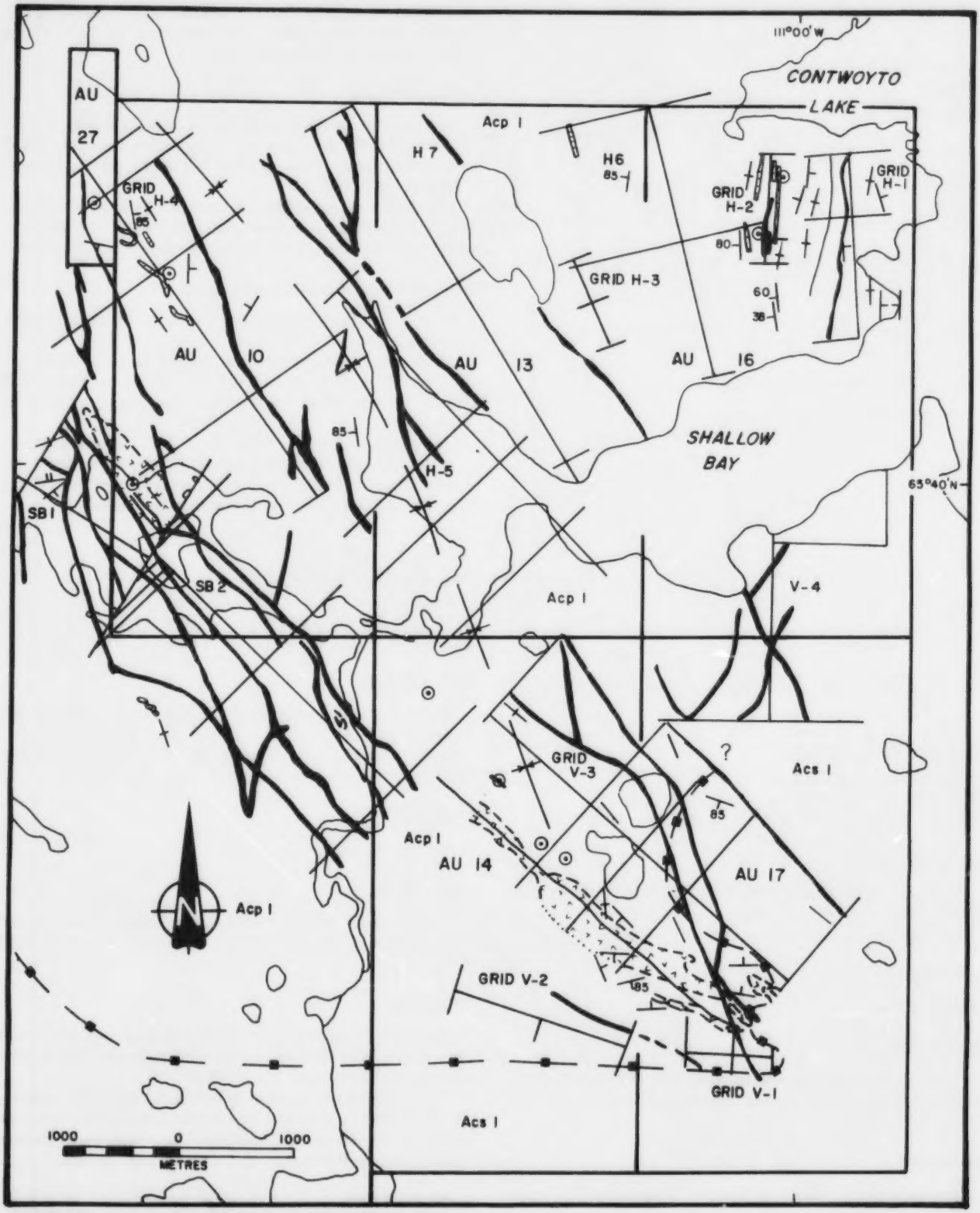



*FIGURE 8-30: Geology of the AU 10, 13, 16, 27 and AU 14, 17 claims.*

LEGEND

PROTEROZOIC

Diabase, gabbro; dykes and sills; may be interpeted from geophysical data.

ARCHEAN

Ac — Contwoyto Formation: (metaturbidites containing iron formation lenses): Acp 1: argillite siltstone, slate, greywacke; some impure quartzite; with grunerite-sulphide iron formation lenses.

Acs 1: nodular quartz-plagioclase biotite schist and gneiss; greywacke; minor graphite schist; with grunerite-sulphide iron formation lenses.

Grunerite-sulphide iron formation.

Intermediate tuff with scattered felsic lapilli, occasional amphibole-chlorite-biotite-ash fragments ± pyrrhotite, pyrite, bornite.

SYMBOLS

Geological boundary.

Bedding, tops known: inclined.

Bedding, tops unknown: inclined, vertical, dip unknown.

Anticline.

Approximate upper limit of greenschist facies (first appearance of cordierite).

Diamond drill hole location.

Grid location.

Tremblay (1976) at 1:50,000 and Fraser (1964) at 1:506,880.

The claims are underlain predominantly by Contwoyto Formation nodular quartz-plagioclase-biotite schists with andalusite, cordierite and staurolite porphyroblasts (Fig. 8-31). Lenses of amphibolitic, locally garnetiferous, silicate-facies iron formation are present within the Contwoyto Formation metasediments. A small pluton of granite intrudes the metasediments in the southern part of AU 15. Northwesterly trending diabase dykes intrude all rock units.

### CURRENT WORK AND RESULTS

**1984:**

A grid was constructed covering AU 15 and part of AU 19 (Fig. 8-31).

Yellowknife Supergroup metasediments underlie most of the grid, except for the southern margin, which is underlain by coarse grained muscovite granite.

The Yellowknife Supergroup metasediments are mainly nodular, biotite, cordierite- or andalusite- bearing schists. Amphibolite or metamorphosed iron formation outcrops locally. The iron formation is, in places, auriferous and is associated with a number of moderate, discrete magnetic highs that trend west-northwesterly across the grid in an en echelon pattern. Northwesterly to north-northwesterly trending diabase dykes produce much stronger and more cor tinuous positive magnetic responses.

VLF results indicate folds with west-northwesterly trending axial planes.

**1985:**

Detailed geological mapping was done at 1:1000 scale on the Amwood E and S grids (Fig. 8-31). Chip samples were taken from old trenches (Robert's Mining Company, 1963 in Tremblay, 1976) and outcrops of iron formation.

## AU, KEG CLAIMS

Cominco Ltd.
Suite 700, 409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 E/10
65°37'N, 110°50'W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).

DIAND assessment reports: 017119, 017120, 017167, 081945, 081952.

### PROPERTY

AU 23, 24; KEG 1, 2.

### LOCATION

The claims are 375 km northeasterly from Yellowknife (Fig. 8-28).

### HISTORY

Prospecting Permit 33 (PP 76-E-10) was granted to Canadian Nickel Company Ltd. in 1962. An aeromagnetic survey was done over the permit in 1962. Follow-up geological mapping and geophysical surveys over detailed grids were done from 1962 to 1964. Three such grids were on ground now held as KEG 2, AU 23, 24. The permit lapsed in 1964 (DIAND assessment reports 017119, 017120, 017167).

AU 23, 24 were recorded in February 1981. They were transferred to Westsun Petroleums and Minerals Ltd. in May 1984 and then to Highwood Resources Ltd. in May 1985.

KEG 1, 2, were recorded in July, 1983 and then optioned by Cominco Ltd.

### DESCRIPTION

The area has been mapped by Fraser (1964), Tremblay (1976) and Bostock (1980) at 1:506,880, 1:50,000 and 1:250,000 respectively. Regional and claim geology are shown in Figures 8-28 and 8-32.

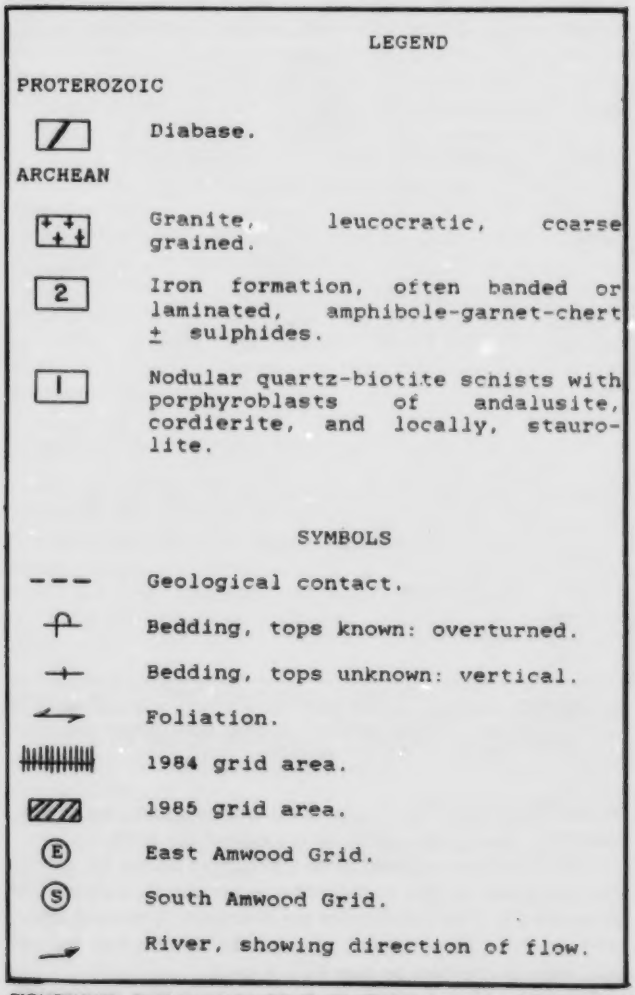
Archean Yellowknife Supergroup metasediments and iron

*TABLE 8-3: SUMMARY OF 1984 WORK DONE ON AU 10, 13, 16 AND 27.*

| Grid | Claim | Geology at 1:2000 scale (Fig. 8-30) | Magnetic Surveys | VLF-EM | Diamond Drilling (Fig. 8-30) | Economic Minerals |
|---|---|---|---|---|---|---|
| H-2 (1983) grid | AU 16 | | | 1983: used Seattle transmitting station; 1984: used Annapolis: results similar to 1983: iron formation associated with very weak discontinuous conductors | 2 holes (172.82 m), both drilled at approximate angle of 45°E: 1) tested an outcropping iron formation at depth 2) tested strong magnetic anomaly & weak VLF conductor; intersected 2 zones of iron formation | gold occurs sporadically in silicate facies iron formation & appears to be associated with pyrrhotite & arsenopyrite |
| H-3 (1983) grid | Au 13 | 80% of the grid area is covered by overburden; area is underlain by argillites & greywackes of upper greenschist facies; bedding trends NNW; several small lenses of silicate facies iron formation in NE part of grid; 4 grab samples taken | | | | 0.34 g/t Au or less |
| H-4 re-est & expanded in 1984 58.66 lkm | AU 10; AU 7, 27 (in part) | mapping not completed; outcrop exposure good in northern & northwestern part of grid; sediments with iron formation & some intermediate volcaniclastics | vertical gradient & total field; iron formation correspond with weak, linear, positive anomalies | used Seattle transmitting station; 2 moderate to strong conductors, 1 coincident with a magnetic anomaly | 2 holes (162.8 m): 1) tested coincident magnetic/VLF anomalies 2) tested an iron formation outcrop at depth | concentrations range from 0.10 to 1.26 g/t Au over 0.95 m (true width); gold is associated with pyrrhotite & chalcopyrite in iron formation |
| H-5 41.62 lkm | AU 13; AU 10 (part) | outcrop exposed on 1% of grid area; outcrop & felsenmeer: diabase, argillite & greywacke; bedding strikes N, dips subvertically | vertical gradient & total field over northern half of grid; weak anomaly possibly caused by iron formation | not completed for northern half of grid VLF in southern part, over land area only; used Cutler station | | |
| H-6 36.72 lkm | AU 13; AU 16 | outcrop exposed on 40% of grid area; underlain by argillite & greywacke with interbedded, discontinuous layers & lenses of iron formation containing variable amounts of sulphides & magnetite | vertical gradient & total field, numerous spot highs- cause unknown; 1 weak anomaly corresponds to a VLF conductor | a moderate to strong conductor coincides with various magnetic responses in the southern part of grid; used Cutler station | | 6 grab samples taken of sulphidic iron formation; essays range from 0.10 to 0.34 g/t Au; associated with pyrite, pyrrhotite & chalcopyrite |
| H-7 59.44 lkm | AU 13; AU 10 (part) AU 12 (part) | | several isolated magnetic dipoles & weak spot highs, possibly indicative of iron formation | 3 weak responses coincident with magnetic responses; used Cutler station | | |
| SB-1 East 41.52 lkm SB-1 and SB-2 | Au 10 (part) rest on Au 7 SB-1 East Detail btwn lines 7+20 E 9+60 E, 5+60 N to Shallow Bay shoreline | scattered outcrops & felsenmeer; believed underlain by greywackes interbedded with argillites; in NE area, intermediate volcaniclastics and N to NNW trending diabase dykes; bedding strikes NNW, dips steeply to NE | one strong anomaly is coincident with a weak VLF conductor; caused by diabase dyke cutting volcanics | anomalies correspond with mag, detailed VLF rerun using Cutler station (results were negative;) diamond drilled this anomaly, also weak responses corresponding with mag under Shallow Bay | 1 hole (102.72 m), intersected a narrow zone of pyrrhotite-bearing, mafic to intermediate lapilli tuffs | tuff assayed 0.10 g/t Au |
| SB-2 | AU 10 (part) rest AU 11, 14 | scattered outcrops & felsenmeer; believed underlain by greywackes interbedded with argillites | | used Annapolis station; weak conductor coincident with magnetic anomaly | | |
| V-4 41.90 lkm | 52% on AU 17 rest on AU 16 | | most responses due to diabase dykes; several weak responses may be due to iron formation | broad, weak response coincident with magnetic anomaly, believed to be pyrite/pyrrhotite or graphite within iron formation | | |

**TABLE 8-4: SUMMARY OF 1984 WORK DONE ON AU 14, 17.**

| Grid | Claim | Geology | Geophysics: Magnetic | Geophysics: VLF | Diamond Drilling | Mineralization |
|---|---|---|---|---|---|---|
| BF | AU 14, 17 | Refer to Figure 8- . The intermediate tuffaceous volcanics appear to form limb of ESE-trending synform. Iron formation outcrops near sediment/ volcanic contact and appears to be folded about E-W trending axes. | Readings every 10 m. Weak response to iron formation which may correspond to a weak VLF response | Readings every 20 m. Weak to moderate response with coinciding magnetic trend may indicate iron formation | 3 holes (221.9 m), tested geophysical anomalies; iron formation intersected in all holes; Sulphide minerals are pyrrhotite, pyrite. Assays from 0.1 to 2.94 g/t Au over 0.5 m | Gold is in iron formation associated with pyrite, hematite, magnetite, 1.80 to 8.35 g/t Au. |
| SB-2 | AU 14 (part) 9.0 km or 12.2% of grid | no outcrop on AU 14 part of grid. Drilling intersected metasedi-ments of upper greenschist facies | Indicated 2 NW-trending diabase dykes. Possible iron formation indicated by weak dipoles | One weak response flanking magnetic dipole-possibly iron formation | 1 hole, 54 m, tested magnetic peak. Iron formation with pyrrhotite intersected. Low gold values | Weak gold concentrations associated with 1 to 5% pyrrhotite in iron formation |
| V-4 | AU 17 (part) 19.76 km or 45% of grid | | Numerous weak dipoles possibly indicative of iron formation | One moderate response flanking magnetic dipole-possibly indicating iron formation | | |



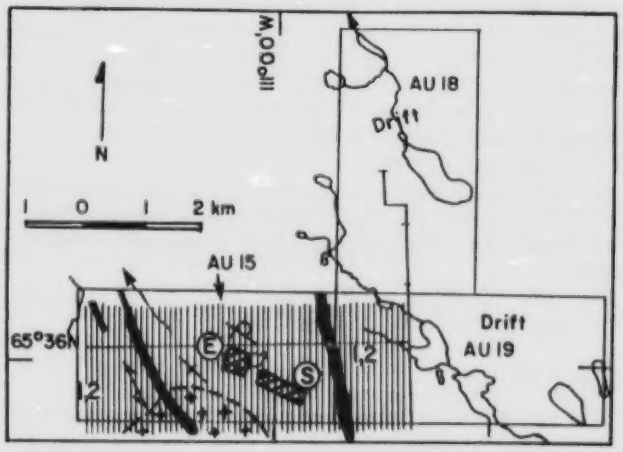




*FIGURE 8-31: Geology of the AU 15, 18, 19 claims showing 1984 and 1985 grids.*

formation underlie most of the claim area. The iron formation is amphibolitic and garnetiferous, locally with chlorite, pyrite, arsenopyrite and native copper. Overburden covers much of the northern and central areas of the claims (Fig. 8-32).

## CURRENT WORK AND RESULTS

Airborne EM and magnetic surveying were done over the claims in 1985.

A grid, totalling 75 line km, was set up over KEG 2 and AU 23, 24. Detailed VLF and magnetic surveying and mapping were done. The VLF survey outlined several conductors in areas of overburden.

The claims were mapped at 1:2500 scale. Chip and grab samples from all iron formations were assayed for gold.

## NC, PTC CLAIMS

Cominco Ltd. — Gold
Suite 700, 409 Granville St. — 76 E/10
Vancouver, B.C., V6C 1T2 — 65°35'N, 110°50'W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).
DIAND assessment reports: 017119, 017120, 017167, 081942, 081952.

### PROPERTY

NC 1, PTC 1.

### LOCATION

The claims are 395 km northeasterly from Yellowknife, west of Contwoyto Lake (Fig. 8-28).

### HISTORY

From 1962 to 1964, Canadian Nickel Company Ltd. carried out reconnaissance and detailed geological mapping, aeromagnetic surveying and follow-up ground magnetic surveying on Prospecting Permit 33 (PP 76-E-10) which covered the area now staked as NC 1 and PTC 1. In 1963, on what is now NC 1, samples were taken and assayed for gold, with poor results. The permit lapsed in 1964 (DIAND assessment reports 017119, 017120, 017167).

No assessment work was reported on the claims from 1964 to 1983. In 1983, the claims were staked for Wellington Resources Ltd. (later becoming Gyro Energy and Minerals Corp.).

In 1984, the claims were acquired by Cominco Ltd. who is in joint venture with Cogema Ltee.

### DESCRIPTION

The property is underlain predominantly by metamorphosed argillites and greywackes of the Yellowknife Supergroup (Figs. 8-28 and 8-32). Bedding and foliation trend northwesterly and dip steeply to the southwest. Outcrops of silicate-facies iron formation are in the northwest, south-central and southwestern parts of NC 1 and in the southwestern part of PTC 1. Small bodies of granite and northwesterly trending diabase dykes intrude the sediments.

Fraser (1964), Tremblay (1976) and Bostock (1980) mapped the area at 1:506,880, 1:50,000 and 1:250,000 respectively.

### CURRENT WORK AND RESULTS

**1983:**

Reconnaissance mapping was done on NC 1. Iron formation was discovered in three areas. A grid was set up over the south-central iron formation, which is locally pyritiferous, and detailed geological mapping and geophysical surveying were carried out (Fig. 8-32). The VLF and magnetic surveys failed to give significant responses. Sampling of iron formation assayed up to 0.273 g/t Au.

**1985:**

Grids on NC 1 and PTC 1 were mapped in detail. VLF surveys were done on both grids; a magnetic survey was done on the PTC 1 grid (Fig. 8-32). Grab and chip samples of iron formation from both grids were assayed for gold.

The VLF survey outlined three conductors on the NC 1 grid. One is apparently due to sulphides in an iron formation; the causes of the other conductors are unknown. One conductor, believed to be an extension of sulphide-bearing iron formation, was delineated on the PTC 1 grid.

Airborne EM and magnetic surveys were also conducted over both claims. Several conductors were outlined.

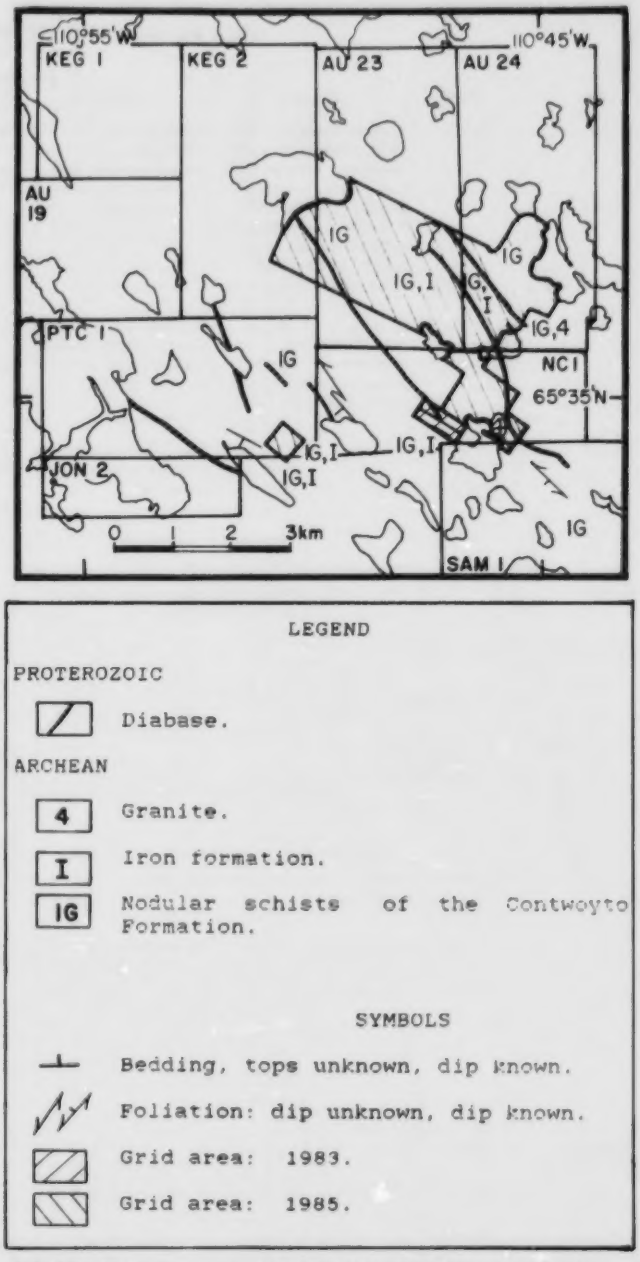



*FIGURE 8-32: Geology of the AU, KEG, NC, PTC SAM and JON claims and grid locations (geology modified from DIAND assessment reports 017120 and 081757).*

## CTL, DIGGER, SAM CLAIMS

Cominco Ltd.
Suite 700, 409 Granville St.
Vancouver, B.C., V6C 1T2

Gold
76 E/10
65°34'N, 110°42'W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).

DIAND assessment reports: 017119, 017120, 017167, 081943, 081944, 081952.

### PROPERTY

CTL 1, DIGGER 1,2; SAM 1,2.

### LOCATION

The claims are near the western shore of Contwoyto Lake, about 390 km northwesterly from Yellowknife (Fig. 8-28).

### HISTORY

Prospecting Permit 33 (PP 76-E-10) was granted to Canadian Nickel Co. Ltd. in 1962. From 1962 to 1964, Canadian Nickel prospected, mapped and aeromagnetically surveyed the permit area. Detail grids were set up and detailed mapping, sampling and magnetic surveying done. Nine of these grids are within the present claim area. Samples from two of these, the Antler A and Drumlin A grids, returned assays of up to 2.40 g/t Au and 8.23 g/t Au, respectively (DIAND assessment reports 017119, 017120, 017167). The permit lapsed in 1964.

CTL 1 and DIGGER 2 were staked by Cominco in October 1983 and August 1985, respectively. DIGGER 1 and SAM 1, 2 were staked in March 1983 by P. Hungle. DIGGER 1 was transferred to D.G. Thomas in July 1983 and was acquired by Cominco in April 1985. SAM 1, 2 were transferred to Roxwell Gold Mines Ltd. in February 1984. Cominco acquired the claims in April 1985.

### DESCRIPTION

The property is underlain primarily by Archean metasediments of the Yellowknife Supergroup, with lenses of garnet- and amphibole-rich iron formation. Granitic and diabase dykes intrude the sediments (Figs. 8-28, 8-33). The region has been mapped by Fraser (1964), Tremblay (1976) and Bostock (1980) at 1:506,880, 1:50,000 and 1:250,000 respectively.

### CURRENT WORK AND RESULTS

Grids were set up over CTL 1, DIGGER 1 and SAM 1,2 in 1985 and detailed geological mapping, sampling and VLF and magnetic surveying were done. Numerous VLF conductors coincident with iron formation were delineated.

Airborne EM and magnetic surveying were also done in 1985, over all the claims.

## AU, BARB, KAP, MINER CLAIMS

Bow Valley Industries Ltd.
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/11
65°40'N, 111°12'W

### REFERENCES

Baragar and Hornbrook (1963); Bostock (1980); Schiller and Hornbrook (1964); Seaton (1978); Seaton and Crux (1985); Tremblay (1976).

DIAND assessment report: 081862.

### PROPERTY

AU 4,5,7,11; BARB 1; KAP 1-3; MINER.

### LOCATION

The claims are 300 km north-northeasterly from Yellowknife and west of Shallow Bay, Contwoyto Lake (Figs. 8-28, 8-34).

### HISTORY

Gold discoveries in the area in 1960 by the Canadian Nickel Company Ltd. resulted in a staking rush in 1961. Most of these claims lapsed by 1973 (Baragar and Hornbrook, 1963; Schiller and Hornbrook, 1964; Tremblay, 1976). The ground was restaked in 1974. These claims lapsed in 1976 (Seaton, 1978). A detailed exploration history of the area is given in Seaton and Crux (1985).

BARB 1 was recorded by P. Hungle in December 1980 and transferred to Barren Lands Exploration Services Ltd. in February 1981. It was then transferred to Highwood Resources Ltd. in January 1983. In February of 1981, AU 4, 5, 7, 11 were recorded for Highwood Resources Ltd. Both the BARB and AU claims were transferred to Kappa Resources Ltd. in February 1983, and then to Bow Valley Industries in April 1984.

KAP 1, 3 and KAP 2, MINER were recorded by P McKay and F. Diamond'C respectively in March 1983, and transferred to Bow Valley Industries in April 1984. Work done in 1983 is summarized in Seaton and Crux (1985).

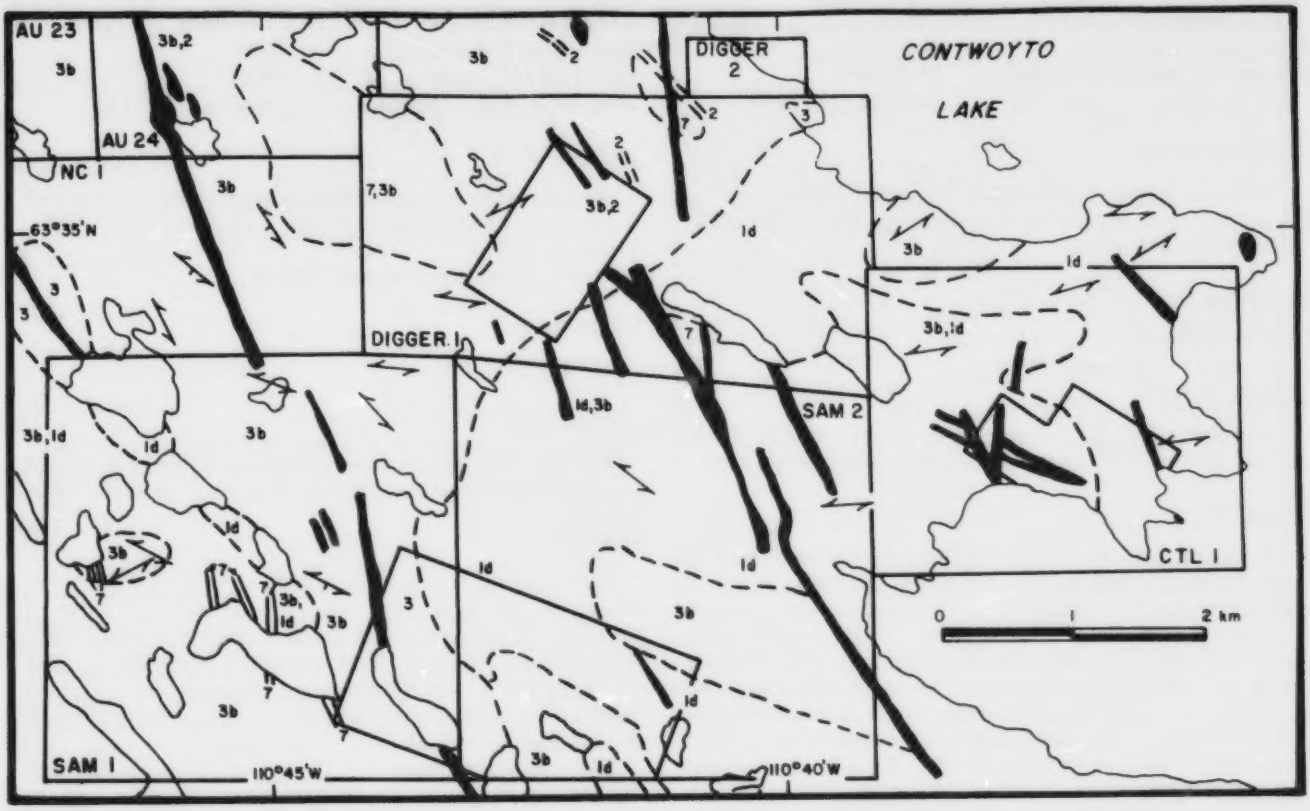
### DESCRIPTION

The regional geology of the claims is shown in Figures 8-28, and 8-34. The claims are predominantly underlain by Archean Yellowknife Supergroup metasediments with interbedded lenses of amphibolitic, silicate- and oxide-facies iron formation. Lower grade metasediments underlie the northeastern half of the claim block. Volcaniclastic tuffs and porphyries are in the southwest corners of MINER, KAP 1 and KAP 2. A small syenite stock intrudes the sediments in the central part of BARB 1. The Norma Fault trends northeast across the northwest corner of AU 4. Numerous Proterozoic diabase dykes intrude all rock types.

Bostock (1980) and Tremblay (1976) mapped the area at 1:250,000 and 1:50,000 respectively.

### CURRENT WORK AND RESULTS

Work carried out over the claims in 1984 is summarized in Table 8-5. The work comprised mapping, diamond drilling and total field magnetic, vertical gradient and VLF surveying on




LEGEND

PROTEROZOIC

Diabase dykes and sills.

ARCHEAN

7 Granite.

3 Metaturbidites, may contain lenses of unit 2:
3b) micaceous.

2 Amphibolitic iron formation.

1 Argillaceous metasedimentary rocks: 1d) quartz mica schist.

SYMBOLS

Geological contact.

Foliation: dip unknown, dip known.

Grid area.

*FIGURE 8-33: Geology of the CTL, DIGGER and SAM claims (geology modified from DIAND assessment report 017120).*

grids shown in Figure 8-34. Gold appears to be associated with pyrite and/or pyrrhotite and, locally, arsenopyrite in silcate- facies or oxide-facies iron formation. The iron formation may or may not be garnetiferous.

## PIXIE CLAIM

Bow Valley Industries Ltd.
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/11
65°42'30"N, 111°21'W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).

DIAND assessment reports: 017161, 017200, 017203, 017205, 017210, 060330, 082047.

### PROPERTY

PIXIE.

### LOCATION

The claim is 390 km northwesterly from Yellowknife (Fig. 8-28).

### HISTORY

In 1962, the area now held as PIXIE was part of five claim groups: the JE group, owned by the Earl-Jacks Syndicate; the BAR and SP groups, owned by the Big Four Syndicate;

**TABLE 8-5: SUMMARY OF 1984 WORK DONE ON AU, BARB, KAP AND MINER CLAIMS.**

| Grid | Claim | Geology (mapping at 1:2000 unless otherwise stated) | Magnetic Surveys | VLF-EM | Diamond Drilling | Mineralization |
|---|---|---|---|---|---|---|
| P-1 (covers 1963 PAN showing, PAN claims | BARB 1 | | to outline extensions of iron formation; intersected by ddh P-9-84-iron formation does not appear to be continuous with the PAN showing | | 6 holes (393.56 m), to systematically test PAN iron formation at 20 m & 50 m vertical depth | garnet-poor, pyrrhotite-rich iron formation contains the highest gold concentrations; highest assays: 7.36 g/t Au over 3.58 m & 2.80 g/t Au over 2.87 m |
| K-3 | AU 4 | | | | 1 hole ( 61.9 m) to test coincident VLF & magnetic responses associated with iron formation | 2 iron formations intersected contain negligible gold |
| P 3 (new) | BARB 1<br>KAP 3 (part) | outcrop or felsenmeer exposed on 20% of grid; NE part underlain by syenite & SE part by greywacke and iron formation | 1:2000; magnetic response flat except over iron formation, syenite or diabase | 1:2000; flat response; one broad anomaly possibly due to iron formation | 1 hole (60.40 m) to test iron formation at depth; 1.5 m wide (true) garnetiferous iron formation with pyrite & pyrrhotite | grab samples of iron formation assayed from 1.57 to 3.25 g/t Au; gold associated with pyrite, arsenopyrite & locally pyrrhotite |
| K 6 | KAP 3 | N part mapped at 1:2000 & detailed grid area at 1:1000; underlain by meta-greywacke, meta-argillite & a thin zone of iron formation | 1:1000; diabase & iron formation better defined at this scale | iron formation is a strong conductor | 2 holes (142.05 m); one to test an iron formation sampled in 1983; the other to test an iron formation sampled in 1984 | gold associated with pyrrhotite, pyrite & locally arsenopyrite. One iron formation has high gold content |
| K 7 (new) | KAP 3 | underlain by metasediments with one thin unit of iron formation | 1:2000; iron formation gives spot highs & has discontinuous magnetic expression | 1:2000; iron formation is strongly conductive | 2 holes (138.42 m) to test iron formation at depth | grab samples assayed up to 1.33 g/t Au; gold is associated with arsenopyrite, pyrrhotite & minor pyrite |
| K-8 (new) | AU 4 | underlain by metasediments with several iron formation lenses, which locally contain garnets & sulphides | 1:2000; most iron formation has weak response; one iron formation has strong response but is barren of gold | 1:2000; iron formation is weakly to moderately conductive | | gold, varying concentrations, associated with pyrite, pyrrhotite & arsenopyrite |
| BLG (new) | AU 5<br>AU 4<br>BARB 1 | underlain mainly by overburden, lakes & swamps; in NE part volcaniclastic tuff interfingered with metasediments; iron formation garnetiferous & pyritiferous with minor arsenopyrite, pyrrhotite, chalcopyrite & malachite | 1:2000; numerous magnetic dipoles, possibly indicative of iron formation | 1:2000; 2 surveys over E part of grid- used Annapolis & Cutler stations; Central & W parts of grid surveyed using Annapolis station | 1 hole (101.1 m) to test strong VLF response; intersected diabase & sulphide-rich metasediments | Assays ranged from 0.10 to 1.02 g/t Au |
| SB-1 East; W includes (West Inclined Detail and West Detail Detail grid | AU 7 (also part of AU 10) | mapping at 1:2000 & 1:500; Shallow Bay covers SW half of grid; tuffs & porphyries are in N part of grid, sediments with iron formation towards the S & W parts; no garnets in iron formation | 1:2000, 1:100; iron formation has weak discontinuous response; stronger response caused by magnetite in iron formation | 1:2000; 1:500; weak conductive zones reflect sulphidic iron formation & tuffs | 14 holes (1218.09 m) to test auriferous showings; several silicate-oxide facies & silicate-sulphide facies iron formations intersected at depth | gold concentrations very; some visible gold |
| SB-2 | AU 11 (also part of AU 10, 14) | most of area covered by water, swamps & over-burden grid area is underlain by tuff, metasediments & granetiferous iron formation | 1:2000; iron formation gives weak magnetic response | 1:2000; broad weak conductive zones possibly indicative of | | gold is associated with pyrite & arseno-pyrite in iron formation |

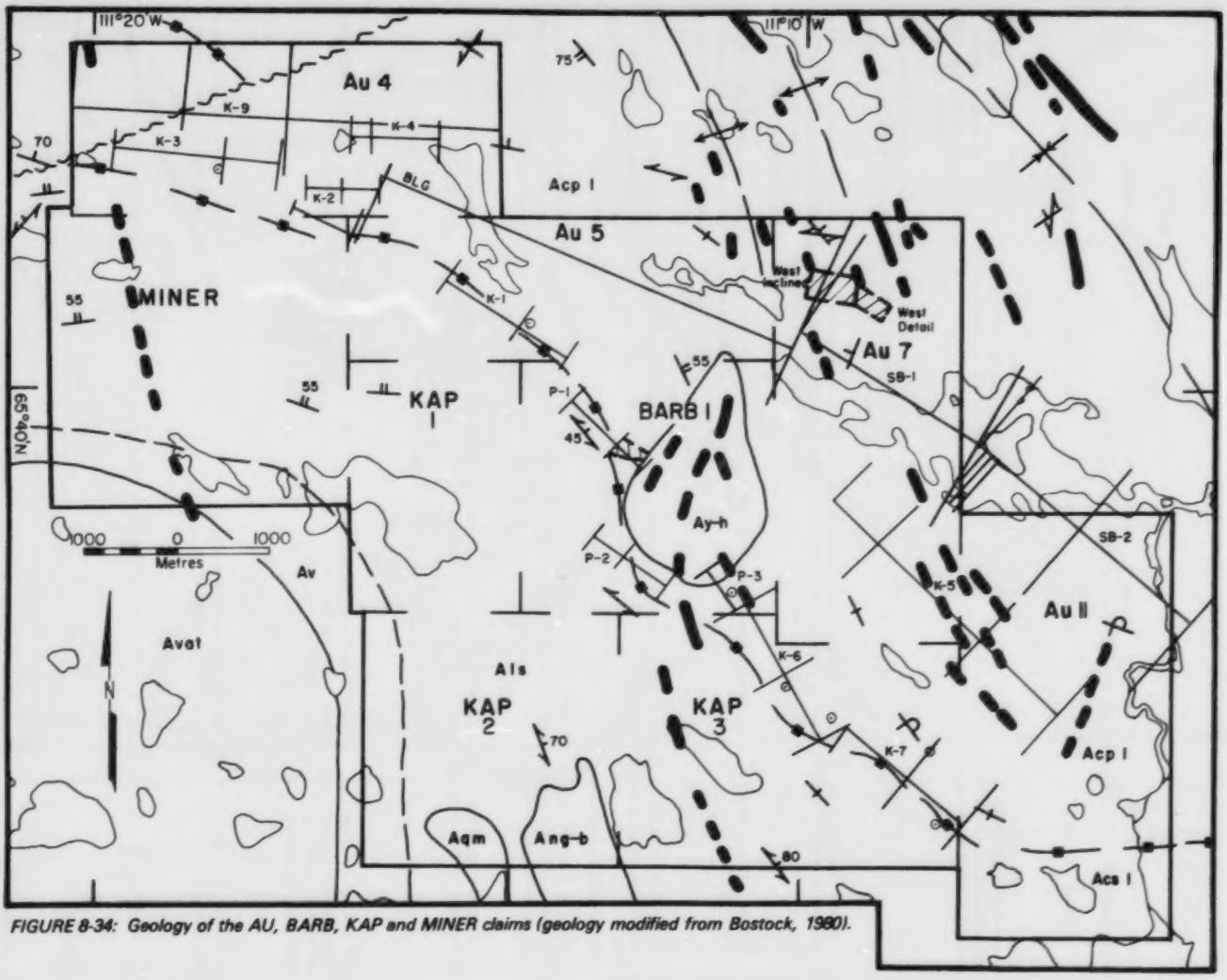



*FIGURE 8-34: Geology of the AU, BARB, KAP and MINER claims (geology modified from Bostock, 1980).*

and the NOR and GUN groups, owned by North Goldcrest Mines Ltd. All were staked in 1962. Work done on the claims in 1962 (except for the BAR group - 1962 and 1963) included mapping, prospecting, trenching and EM surveying (DIAND assessment reports 017161, 017200, 017203, 017205, 017210, 060330).

PIXIE was recorded in March 1983 by P. McKay and transferred to Rockridge Mining Corporation in 1984. Bow Valley optioned the claim in 1985.

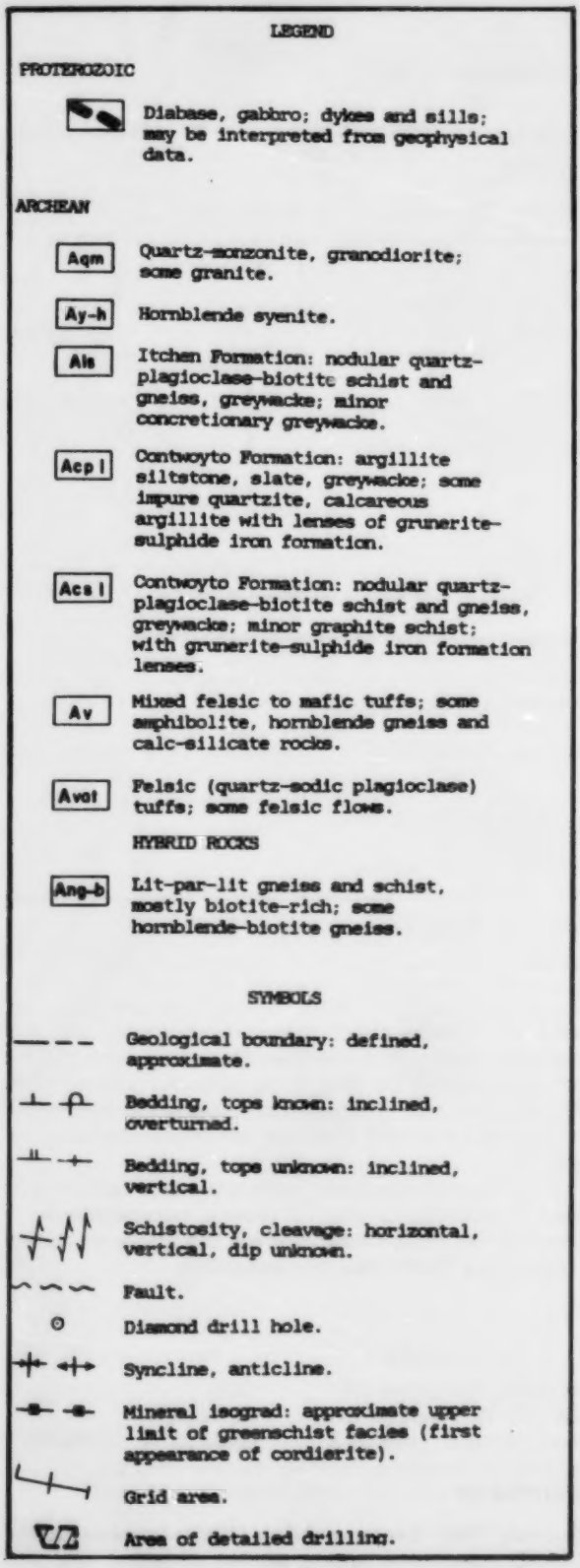
## DESCRIPTION

The regional and claim geology are shown in Figures 8-28 and 8-35. Yellowknife Supergroup metaturbidites underlie PIXIE. Greenschist facies rocks are in the northern third of the claim; amphibolite facies in the southern two-thirds. Sulphide-facies iron formation is intercalated with the metasediments. The Norma Fault trends northeasterly across the southeastern corner of the claim.

Fraser (1964), Tremblay (1978) and Bostock (1980) mapped the area at 1:506,880, 1:50,000 and 1:250,000 respectively.

## CURRENT WORK AND RESULTS

Airborne INPUT EM and magnetic surveys, flown over 53 line km, delineated three anomalous zones. A grid was set up over each zone (Fig. 8-35) and follow-up detailed ground magnetic, VLF and HLEM surveys, mapping and sampling were done. Six diamond drill holes, totalling 503 m, tested geophysical anomalies; four of these intersected sulphide-facies iron formation. Numerous grab and core samples were analyzed for gold. Grab sample assays were low, but core sample assays were better.


LEGEND
PROTEROZOIC
Diabase, gabbro; dykes and sills; may be interpreted from geophysical data.
ARCHEAN
Aqm
Quartz-monzonite, granodiorite; some granite.
Ay-h
Hornblende syenite.
Als
Itchen Formation: nodular quartz-plagioclase-biotite schist and gneiss, greywacke; minor concretionary greywacke.
Acp l
Contwoyto Formation: argillite siltstone, slate, greywacke; some impure quartzite, calcareous argillite with lenses of grunerite-sulphide iron formation.
Acs l
Contwoyto Formation: nodular quartz-plagioclase-biotite schist and gneiss, greywacke; minor graphite schist; with grunerite-sulphide iron formation lenses.
Av
Mixed felsic to mafic tuffs; some amphibolite, hornblende gneiss and calc-silicate rocks.
Avol
Felsic (quartz-sodic plagioclase) tuffs; some felsic flows.
HYBRID ROCKS
Ang-b
Lit-par-lit gneiss and schist, mostly biotite-rich; some hornblende-biotite gneiss.
SYMBOLS
Geological boundary: defined, approximate.
Bedding, tops known: inclined, overturned.
Bedding, tops unknown: inclined, vertical.
Schistosity, cleavage: horizontal, vertical, dip unknown.
Fault.
Diamond drill hole.
Syncline, anticline.
Mineral isograd: approximate upper limit of greenschist facies (first appearance of cordierite).
Grid area.
Area of detailed drilling.

## AU 6, 8, 9, 12

Bow Valley Industries Ltd.
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/11
65°43'N, 111°07'W

### REFERENCES

Baragar and Hornbrook (1963); Bostock (1980); Schiller and Hornbrook (1964); Tremblay (1976).

DIAND assessment reports: 017104, 017211, 017231, 081889.

### PROPERTY

AU 6, 8, 9, 12.

### LOCATION

The claims (Fig. 8-28) are 390 km northeasterly from Yellowknife and roughly 5 km southeast of Lupin Mine. They form a block extending from Fingers Lake to Contwoyto Lake.

### HISTORY

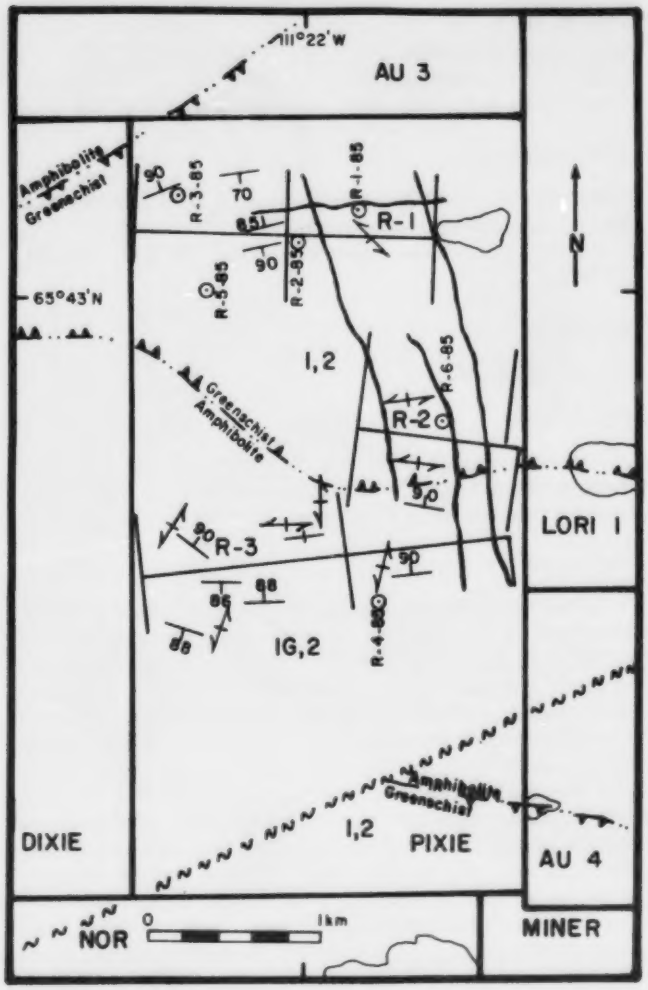
Following discovery of gold, in 1960, by Canadian Nickel Company Ltd., at what is now Lupin Mine, the area was extensively staked. The AU 6, 8, 9, 12 claim block covers part of ground staked in the early sixties as the BOX, FOX and BAY groups, staked by Conwest Exploration Co. Ltd. and Earl-Jacks Syndicate respectively. The FOX and BOX claims were subsequently optioned to Falconbridge Nickel Mines Ltd. The BAY group was optioned to a group of companies that included Faraday Uranium Mines Ltd., Amalgamated Larder Mines Ltd., Gunnex Ltd. and Rayrock Mines Ltd. (Baragar and Hornbrook, 1963; Schiller and Hornbrook, 1964). From 1961 to 1964 these claims were explored by prospecting, geological mapping, trenching, diamond drilling, and magnetic surveying. A mineralogical study was also done (DIAND assessment reports 017104, 017211, 017231; Tremblay, 1976).

Many of the claims recorded during the sixties' staking rush eventually lapsed. Part of this ground was restaked as AU 6, 8, 9, 12 in February 1981 and acquired by Great Bear Development Corporation, which geologically reconnoitred the claims prior to optioning them to Bow Valley Industries Ltd. in the fall of 1983.

### DESCRIPTION

The area was mapped at 1:250,000 by Bostock (1980) and at 1:50,000 by Tremblay (1976).

The property is underlain by greenschist facies metasediments of the Contwoyto Formation of the Yellowknife Supergroup (Figs. 8-28 and 8-36). In the southern part of the property, the metasediments are folded about a northwesterly plunging axis. The axial zone of the fold passes under Fingers Lake and occupies much of AU 6. To the east, on AU 9, 12, on the eastern limb of the fold, bedding strikes north-northwesterly with steep to vertical dips. The east-northeasterly trending Norma Fault passes through the northwestern corner of AU 6, and the northern parts of AU 9, 12, and is marked by a pronounced change in strike of bedding,




LEGEND

PROTEROZOIC

Diabase.

ARCHEAN

1 — Greywacke, crudely foliated, massive to bedded; argillite, chloritic, locally graphitic.

2 — Nodular biotite schist with cordierite and andalusite porphyroblasts, well foliated.

IG — Iron formation, locally banded with amphibole or garnet, rarely with sulphides.

SYMBOLS

Bedding, tops known: inclined, vertical.

Foliation: vertical.

Norma Fault.

Metamorphic isograd, teeth on lower grade side.

Diamond drill hole.

Grid area.

*FIGURE 8-35: Geology of the PIXIE claim.*

which on AU 8 and the northern part of AU 9, 12 is northeasterly.

The Contwoyto Formation comprises greywacke and argillite with lenses of iron formation. Only a few argillite with lenses have been reported on the property, mainly on AU 8, 12. Though sulphide-bearing iron formation is commonly auriferous on properties nearby, on AU 6, 8, 9, 12 the highest assay obtained during propecting by Falconbridge in 1962 was 1.2 g/t Au, with other samples assaying 0.3 g/t Au or less. No iron formation has been found on AU 6.

### CURRENT WORK AND RESULTS

Two grids were established: the FL-1 Grid, 51.64 line km, and the FL-2 Grid, 7.93 line km (Fig. 8-36). Together the grids cover most of Fingers Lake and AU 6; the eastern part of the FL-2 grid is on AU 9.

Geological mapping, total field and vertical gradient magnetic and VLF surveying were done on the grids. The grids are underlain by greywacke and argillite, which are, locally, graphitic. Pyrite and pyrrhotite locally give rise to rusty patches.

Most of the strong magnetic features on the grids are caused by diabase dykes that strike northwesterly and presumably belong to the Helikian Mackenzie Swarm. Two short, northeasterly trending, linear magnetic features north of Fingers Lake were interpreted to be caused by iron formation, as were a few other weak and non-conductive magnetic highs.

A non-magnetic conductor north of Fingers Lake may be caused by suphide- or graphite-bearing metasediments.

The majority of VLF anomalies are thought to be caused by conductive Quaternary lake sediments.

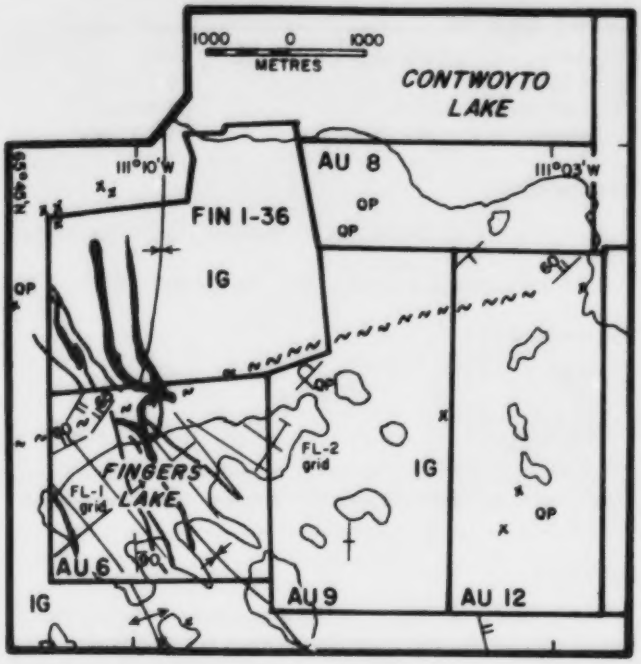
## AU 2, 3 CLAIMS

Bow Valley Industries Ltd
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/11,14
65°44'30"N, 111°24'W

### REFERENCES

Bostock (1980); Seaton and Crux (1985); Tremblay (1976).
DIAND assessment reports: 081740, 081857.




LEGEND

PROTEROZOIC

Diabase.

ARCHEAN

YELLOWKNIFE SUPERGROUP

IG — Predominantly greywacke and argillite of greenschist facies metamorphic grade, locally interbedded with bands of iron formation and quartz-feldspar porphyry (QP).

SYMBOLS

Bedding, tops known: inclined, vertical, overturned.

Bedding, tops unknown: inclined, vertical.

Fault.

Syncline, anticline.

QP — Outcrops of quartz-feldspar porphyry.

Outcrops of garnet-grunerite gneiss (iron formation).

*FIGURE 8-36: Geology of the AU 6, 8, 9, 12 and FIN claims (geology modified from DIAND assessment report 081889 and Tremblay, 1976).*

## PROPERTY

AU 2,3.

## LOCATION

The claims are 395 km northeasterly from Yellowknife, in the vicinity of Sun Bay on Contwoyto Lake (Figs. 8-28,8-37).

## HISTORY

The exploration history of the area is presented in Seaton and Crux (1985).

AU 2, 3 were recorded in February 1981 for Great Bear Development Corporation and are under option to Bow Valley Industries Ltd. In 1983, mapping and geophysical surveys were done (DIAND assessment report 081740; Seaton and Crux, 1985).

## DESCRIPTION

The regional geology is shown in Figures 8-28 and 8-37. The claims are underlain by greenschist and amphibolite facies metasediments of the Yellowknife Supergroup. Numerous lenses of silicate-facies iron formation trend easterly within the metasediments. A granitic pluton covers the northern part of the claims.

Bostock (1980) and Tremblay (1976) mapped the area at 1:250,000 and 1:50,000 respectively.

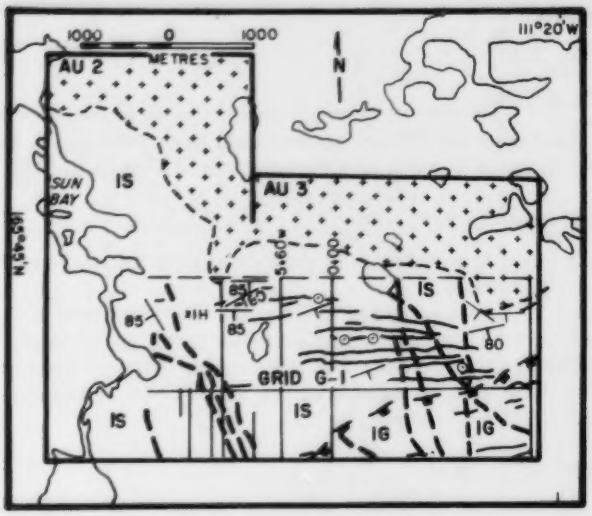
## CURRENT WORK AND RESULTS

Work begun in 1983 over the G-1 grid, including magnetic, VLF and geological surveying, was completed during the 1984 field season. A total of 28.56 line km of VLF, using the Cutler transmitting station, was carried out over the western part of the G-1 grid. A moderate, east-trending conductor at the south end of the grid, delineated in 1983, was found to continue to the west. Several other weak to moderate conductors coincide with weak to strong magnetic responses. These are interpreted to be due to iron formation. Numerous north-northwesterly trending dykes were outlined by the magnetic surveys.

Geological mapping, begun in 1983 over the western part of the G-1 grid, was completed. The grid is underlain predominantly by amphibolite facies nodular schists. In the southeast part of the grid, the greywackes and argillite are greenschist facies. Numerous lenses and bands of iron formation are interbedded with the sediments (Fig. 8-37). Bedding strikes predominantly east and dips steeply to the south. Over 150 grab samples of iron formation were assayed for gold; 14 samples assayed greater than 1.0 g/t Au. Gold is associated with banded pyrrhotite and arsenopyrite. A small frost-heaved area of intermediate tuffaceous volcanics is exposed on the west end of the grid. Intermediate volcanics were also intersected in drill holes.

The northeast corner of the grid is underlain by coarse-grained leucocratic granite. Numerous small granitic dykes intrude the sediments throughout the grid area.

Five holes totalling 291.74 m, were drilled on AU 3 to test known iron formation at depth. One hole tested a strong VLF anomaly coincident with a magnetic anomaly. Two holes intersected iron formation at depth; assays are 1.99 g/t Au over 0.96 m and 1.12 g/t Au over 1.02 m.




LEGEND

PROTEROZOIC

Diabase, gabbro dykes and sills; may be interpreted from geophysical data.

ARCHEAN

Granite: coarse grained to pegmatitic, leucocratic, biotite-muscovite assemblage.

IH — Intermediate volcanics: andesitic tuff, amygdaloidal andesitic flows, porphyritic andesite ± pyrrhotite, pyrite.

Iron formation: rusty weathering, silicate-facies, amphibole-quartz-chlorite ± garnet, epidote, feldspar and sulphides.

IG — Greywacke, argillaceous greywacke: medium to fine grained, weakly foliated, often siliceous.

IS — Nodular schists with cordierite ± andalusite, staurolite porphyroblasts, well foliated.

SYMBOLS

Geological contact.

Bedding, tops unknown: inclined.

Metamorphic isograd: boxes on low grade side.

Diamond drill hole.

Grid location.

*FIGURE 8-37: Geology of the AU 2, 3 claims.*

## WEST CLAIM

Western Canadian Mining (WCM) Ltd.
Suite 2000,
1055 W. Hasting St.
Vancouver, B.C., V6E 3V3

Gold
76 E/11,14
65°45'N,
111°20'W

### REFERENCES

Baragar and Hornbrook (1963); Bostock (1980); Tremblay (1976).

DIAND assessment reports: 017209, 081895, 081915.

### PROPERTY

WEST.

### LOCATION

The claim is approximately 400 km north-northeasterly from Yellowknife near the northwestern shore of Contwoyto Lake (Fig. 8-28).

### HISTORY

The ground now held as WEST was staked in the early sixties as part of the Big Four Syndicate's RY claims and the Earl-Jacks Syndicate's BL claims, on NTS 76 E/14, and the Canadian Nickel Company Ltd.'s MOP claims on NTS 76 E/11. No work has been recorded for the RY claims. On the BL and MOP claims, geological mapping, prospecting and geophysical surveying were done in 1962 (Baragar and Hornbrook, 1963; DIAND assessment report 017209).

WEST was staked by P. McKay and transferred to C.W. O'Sullivan in 1983. Consort Energy Corporation acquired the property in 1984. In 1985, the property was transferred to Brinco Ltd., who in turn transferred the claim to their subsidiary, Western Canadian Mining (WCM) Limited, in 1986.

### DESCRIPTION

The regional geology was mapped by Bostock (1980) and Tremblay (1976) at 1:50,000 and 1:250,000 respectively, and is shown in Figures 8-28 and 8-38.

The area is underlain by granodioritic rocks in the northwestern portion of the claim and by metasediments of the Yellowknife Supergroup in the southern and eastern sections (Fig. 8-38). Bedding trends north-northeasterly to northeasterly and dips steeply to the southeast. Numerous narrow zones of silicate-facies iron formation are interbedded with the sediments. These zones are locally sulphidic with pyrrhotite, pyrite and minor arsenopyrite and magnetite.

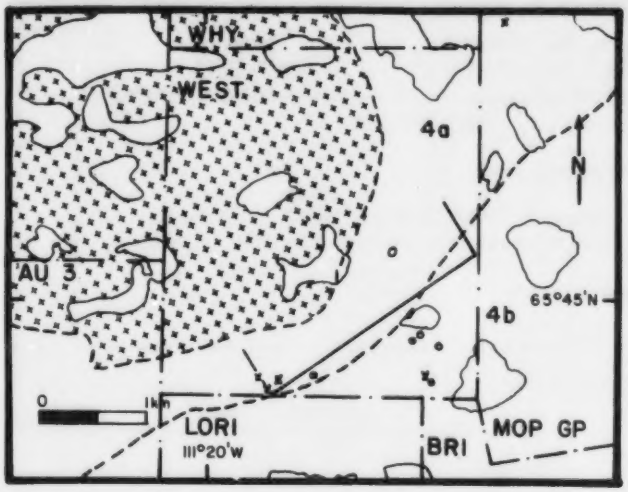
### CURRENT WORK AND RESULTS

**1984:**

The 1984 work was done for Consort Energy Corporation and included detailed geological mapping and magnetic and VLF surveying on a grid set up over the metasediments (Fig. 8-38). Grab samples of iron formation were analyzed for gold. Assays ranged from less than 0.10 to 0.82 g/t Au. The magnetic and VLF surveys outlined several iron formations.

**1985:**

Chip, grab and core sampling of iron formations and dia-




LEGEND

ARCHEAN

Granite.

YELLOWKNIFE SUPERGROUP

4a Nodular quartz-biotite schist.

4b Argillite, greywacke.

SYMBOLS

Geological contact.

O 1985 diamond drill hole locations.

x Iron formation outcrops (from Tremblay, 1976).

Grid location.

*FIGURE 8-38: Geology of the WEST claim, showing iron formation outcrops and 1985 drill holes (geology from Tremblay, 1976).*

mond drilling were done for Brinco Ltd. Six holes totalling 400 m were drilled. Five holes tested geophysical anomalies; one tested iron formation at depth. All holes intersected iron formation with varying concentrations of gold. Tungsten was found in one hole.

## SHARE CLAIM

Echo Bay Mines Ltd.
3300 Manulife Place
10180-101st St.
Edmonton, Alta., T5J 3S4

Gold
76 E/12
65°41'N, 111°52'W

### REFERENCES

Bostock (1980)

DIAND assessment reports: 017131, 017137, 017141, 081971.

### PROPERTY

SHARE 1.

### LOCATION

The claim is 380 km northeasterly from Yellowknife (Fig. 8-28).

### HISTORY

In 1962, Prospecting Permit 34 (PP 76-E-12) was granted to Canadian Nickel Co Ltd. and an airborne magnetic survey was flown. From 1962 to 1964, the permit was geologically mapped, and locally mapped, sampled and magnetically surveyed in detail. Some holes were diamond drilled, but not on the ground now staked as SHARE 1 (DIAND assessment reports 017131, 017137, 017141).

SHARE 1 was staked in 1983 for Echo Bay Mines by Trigg, Woollett Consulting Ltd. to cover a visible-gold showing.

### DESCRIPTION

The regional geology is described by Bostock (1980) and is shown in Figure 8-28. Claim geology is shown in Figure 8-39. The claim is underlain primarily by Contwoyto Formation metasediments, with intercalated sulphide-, silicate- and oxide-facies iron formation lenses and minor granodiorite.

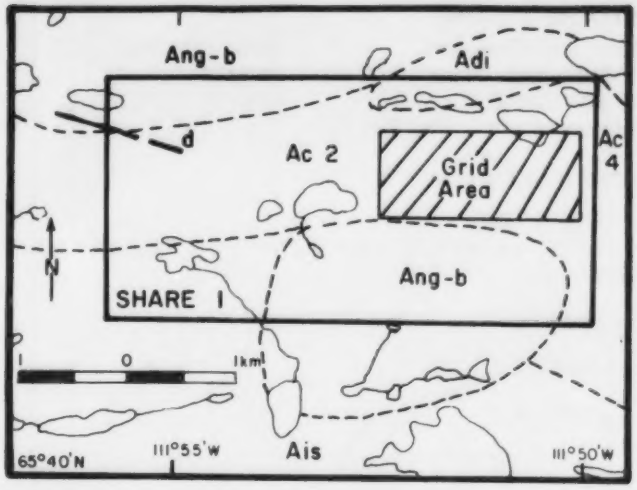
### CURRENT WORK AND RESULTS

**1983:**

Prospecting, geological mapping, trenching and sampling were done. Two gold showings were discovered, one in a quartz vein, the other in silicate-facies iron formation. Six trenches were excavated and channel samples taken. Assays of over 200 channel and grab samples ranged from less that 2.0 to 7.2 g/t Au. A grid was set up and a detailed magnetic survey conducted. Six magnetic anomalies were found, all coincident with iron formation.

**1984:**

Prospecting, geophysical surveying and diamond drilling were done. The 1983 grids were re-established and magnetic, VLF, SP and Max-Min surveys carried out. Four holes were drilled, totalling 451.52 m. One hole tested a visible-gold showing; the others tested magnetic anomalies. Seventy-seven grab samples and 214 core samples of iron formation were analyzed for gold.




LEGEND

PROTEROZOIC

d — Diabase.

ARCHEAN

Adi — Diorite, granodiorite; some medium grained amphibolite, minor banded amphibolite.

Ang-b — Lit-par-lit gneisses; biotite schists with iron formation lenses; granitic rocks containing "rafts" of metasedimentary rocks including iron formation.

YELLOWKNIFE SUPERGROUP

Ais — Itchen Formation (metaturbidites lacking iron formation lenses): nodular quartz-plagioclase-biotite schist and gneiss, greywacke.

Ac — Contwoyto Formation (metaturbidites containing iron formation lenses):
Ac 2: silicate-facies iron formation.
Ac 4: oxide-facies iron formation.

SYMBOLS

--- Geological contact.

1983/84 grid area.

*FIGURE 8-39: Geology of the SHARE claim (geology modified from Tremblay, 1976 and Bostock, 1980).*

## RAFT CLAIMS

Echo Bay Mines Ltd.
3300 Manulife Place
10180-101st St.
Edmonton, Alta., T5J 3S4

Gold
76 E/13
65°48'N, 111°43'W

### REFERENCES

Bostock (1980); Seaton (1984).
DIAND assessment reports: 081201, 081896.

### PROPERTY

RAFT 1.

### LOCATION

The claim is 395 km northeasterly from Yellowknife, to the northwest of Lupin Mine (Fig. 8-28).

### HISTORY

Prospecting Permit 651 was granted to Texasgulf Inc. in 1980. The north part of the permit was mapped and prospected to find copper-tungsten showings in granodiorite. No work has been recorded for the area now staked at RAFT 1 ( Seaton, 1984; DIAND assessment report 081201). The permit was relinquished in January 1982.

RAFT 1 was staked in June 1983, after the discovery of auriferous iron formation in the area. It was staked by Trigg, Woollett Consulting Ltd. for Echo Bay Mines Ltd.

### DESCRIPTION

The regional and claim geology are shown in Figures 8-28 and 8-40. The area was mapped by Bostock (1980) at 1:50,000.

The claim is underlain predominantly by Late Kenoran quartz monzonite and Archean metasediments of the Yellowknife Supergroup containing lenses and rafts of iron formation. In places, the sediments and igneous rocks exhibit a lit-par-lit gneissic texture, which was mapped as a hybrid rock by Bostock (1980).

### CURRENT WORK AND RESULTS

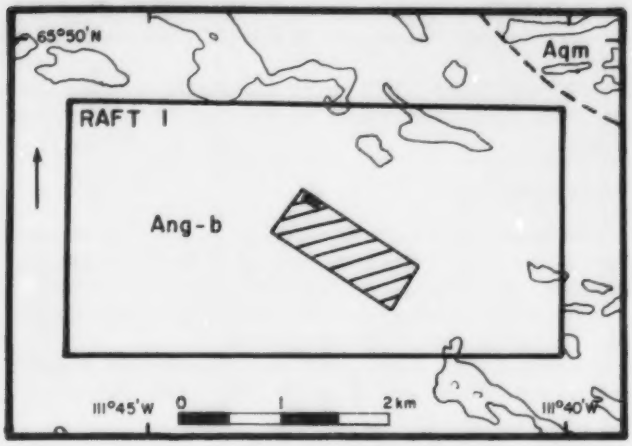
**1983:**

A grid (16 line km) was established over iron formation lenses within quartz monzonite and detailed prospecting and geological mapping done. Three auriferous iron formations were discovered; two were trenched and magnetically surveyed. One iron formation exhibited a strong magnetic signature; the other was magnetically flat. Five trenches were excavated and channel sampled. Grab and channel samples were analyzed for gold. Assays ranged from less than 2.0 to greater than 40.0 g/t Au.

**1984:**

A magnetic survey and diamond drilling tested an auriferous iron formation that was discovered in 1983. A strong magnetic anomaly outlined over the iron formation is probably due to magnetite.

Four holes, totalling 353.60 m, were drilled to test the iron formation. Core samples were assayed for gold, but the assays were not as high as those from surface.




LEGEND

ARCHEAN

Aqm — Quartz monzonite, granodiorite; some granite.

Ang-b — Lit-par-lit gneisses; biotite schists with iron formation lenses; granitic rocks containing "rafts" of metasedimentary rocks including iron formation.

SYMBOLS

Geological contact.

1983 grid - geology.

1983/84 grids - detailed geology, magnetic surveying and trenching.

*FIGURE 8-40: Geology of the RAFT claim (geology modified from Tremblay, 1976 and Bostock, 1980).*

## WHY CLAIM

Argonaut Resources Ltd.
2nd Floor, 73 Water St.
Vancouver, B.C., V6B 1A1

Gold
76 E/14
65°47'N, 111°18'W

### REFERENCES

Baragar and Hornbrook (1963); Bostock (1980); Fraser (1964); Tremblay (1976).

DIAND assessment reports: 017148, 017345, 082042.

### PROPERTY

WHY.

### LOCATION

The claim is approximately 400 km northeasterly from Yellowknife on the northwestern shore of Contwoyto Lake (Fig. 8-28).

### HISTORY

The ground covered by the present WHY claim was previously staked as part of the BL claims and the SUN, WHITE and ESK claims in the early sixties. The BL claims were owned by the Earl-Jacks Syndicate. The area was mapped, prospected and geophysically surveyed in 1962 (Baragar and Hornbrook, 1963). The ESKIMO property (SUN, WHITE and ESK claims) was owned by the Eskimo Syndicate and optioned to Giant Yellowknife Mines in 1962. The claims were mapped and trenched in 1962 and magnetically surveyed in 1963. The option was dropped that year (DIAND assessment reports 017148, 017345).

WHY was staked by F. Diamond'C and recorded in March 1983. The claim was transferred to Argonaut Resources Ltd. in April 1984.

### DESCRIPTION

The claim is underlain by Contwoyto Formation metasediments and iron formation, which are intruded by diabase dykes and granitic dykes and plutons (Figs. 8-28 and 8-41). The geology was mapped by Fraser (1964), Tremblay (1976) and Bostock (1980).

### CURRENT WORK AND RESULTS

An airborne INPUT EM and magnetic survey, totalling 60 line km, was flown over the claims. Two weak conductors, interpreted to be caused by bedrock, were outlined.

## AU 1 CLAIM

Bow Valley Industries Ltd.
2020-1177 W. Hastings St.
Vancouver, B.C., V6E 2K3

Gold
76 E/14
65°48'N, 111°17'W

### REFERENCES

Bostock (1980); Fraser (1964); Tremblay (1976).

DIAND assessment reports: 017129, 017153, 017232, 081849.

### PROPERTY

AU 1.

### LOCATION

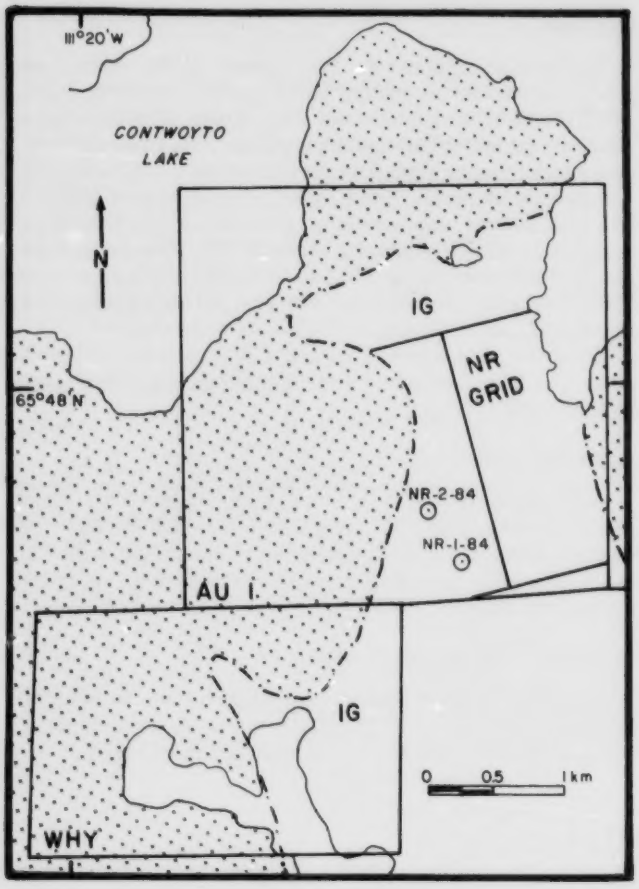
The claim is approximately 395 km northeasterly from Yellowknife and 5 km northwesterly from Lupin Mine (Figs. 8-28, 8-41).

### HISTORY

The ground was staked in 1961 as the DALE claims and the MOP claim group.

The DALE claims were staked by Conwest Exploration Company Ltd. and optioned to Falconbridge Nickel Mines Ltd. In 1962, the claims were mapped (DIAND assessment report 017129); the claims were dropped soon after.

The MOP group was staked for Canadian Nickel Company Ltd. and geological mapping and geophysical surveying were




LEGEND

ARCHEAN

Granite: coarse grained, white to grey, massive, locally pegmatitic.

IG — Nodular schist with cordierite/andalusite porphyroblasts and numerous northerly trending beds of silicate-facies iron formation.

SYMBOLS

NR-2-84 — Diamond drill hole.

Grid location.

Geological contact.

*FIGURE 8-41: Geology of the WHY and AU 1 claims (geology modified from DIAND assessment report 081849).*

done (DIAND assessment reports 017153, 017232). The MOP claims covering the area now held as AU 1 were allowed to lapse.

AU 1 was staked in 1981 for Hemisphere Development Corporation. Bow Valley Industries optioned the claim in late 1983.

### DESCRIPTION

The geology is shown in Figures 8-28 and 8-41. The western part of the claim is underlain by muscovite-biotite granite. Nodular, cordierite- and andalusite-bearing biotite schists of the Yellowknife Supergroup, containing lenses of amphibolitic iron formation underlie the eastern part.

Tremblay (1976), Fraser (1964) and Bostock (1980) mapped the area at 1:50,000, 1:506,880 and 1:250,000 respectively.

### CURRENT WORK AND RESULTS

The claims were geologically mapped and 39.7 line km of grid were established to cover the metasediments. Mapping at 1:2000, total field magnetic, vertical gradient and VLF surveys were done. All anomalies are believed to be caused by sulphide-bearing iron formation. Over 50 grab samples were analyzed for gold; the highest assay was 1.37 g/t Au.

Two holes totalling 162.8 m were drilled to test geophysical anomalies. Hole NR-2-84 intersected a zone of iron formation intruded by late-stage quartz. Samples from this zone assayed up to 1.99 g/t Au over 1.0 m.

## GOLD CLAIM

Hidden Lake Gold Mines Ltd.
P.O. Box 2670
Yellowknife, NWT, X1A 2P9

Gold
76 E/14
65°49'N, 111°04'W

### REFERENCES

Bostock (1980); Fraser (1964); Schiller and Hornbrook (1964); Tremblay (1976).

DIAND assessment reports: 017147, 082049.

### PROPERTY

GOLD 1.

### LOCATION

The claim is 410 m northeasterly from Yellowknife, on a peninsula on the northeastern shore of Contwoyto Lake (Fig. 8-28).

### HISTORY

The ground was staked by Conwest Exploration Ltd. as the ROX 1-54 claims and optioned to Falconbridge Nickel Mines Ltd. In 1962, the claims were geologically mapped, trenched and sampled (DIAND assessment report 017147). In 1963, 194.2 m of diamond drilling was done (Schiller and Hornbrook, 1963).

GOLD 1 was staked and recorded by F. Diamond'C in 1983 and transferred to Hidden Lake Gold Mines in 1984.

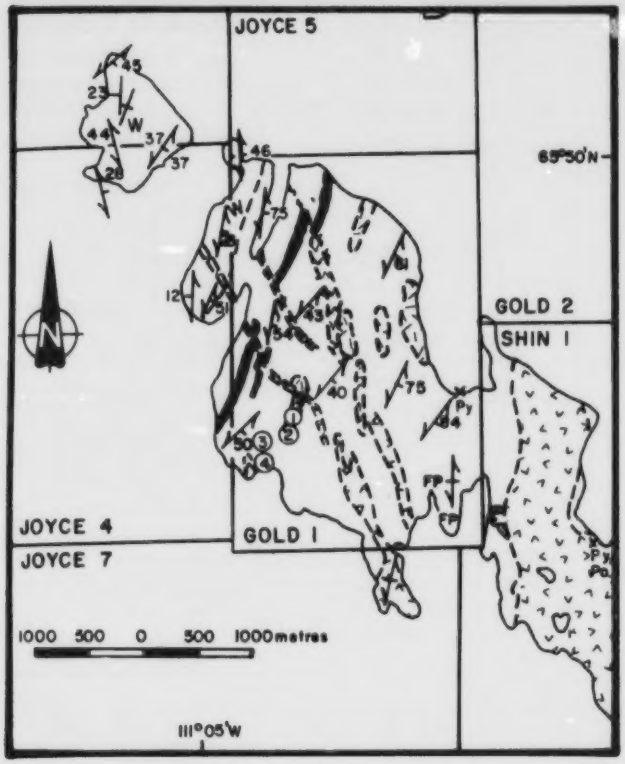



*FIGURE 8-42: Geology of the GOLD claim, showing sample locations 1 to 4. Assay results are:*
*1) 0.12 oz/T Au, 0.35 oz/T Ag;*
*2) 0.10 oz/T Au, 0.34 oz/T Ag;*
*3) 0.04 oz/T Au, 0.26 oz/T Ag;*
*4) 0.02 oz/T Au, 0.46 oz/T Ag.*
*(geology from DIAND assessment report 017147).*

LEGEND

PROTEROZOIC

Diabase dykes and sills.

APHEBIAN

GOULBURN GROUP

W — Western River Formation: slate, dark grey to purplish grey, thinly bedded, with limy-argillaceous, pink to grey concretions; minor white quartzites near contact with Yellowknife Supergroup greywacke.

ARCHEAN

Gabbro, diorite, granodiorite and peridotite/pyroxenite dykes, locally with ilmenite and magnetite.

YELLOWKNIFE SUPERGROUP

Iron formation, rusty weathering, amphiboles ± garnets, arsenopyrite, pyrite, pyrrhotite, chalcopyrite.

Greywacke, siliceous greywacke and schists, slates and phyllites.

SYMBOLS

--- Geological boundary: approximate, assumed.

Bedding: inclined, vertical.

Foliation: inclined, vertical.

~~~ Fault.

Py,Po Pyrite, pyrrhotite.

FP Feldspar porphyry.

① 1962 gold and silver assays, Falconbridge Nickel Mines Ltd, Rox claims, DIAND assessment report 017147.

## DESCRIPTION

Regional and claim geology are shown in Figures 8-28 and 8-42. The claim is underlain by Yellowknife Supergroup metasediments and iron formation and cut by numerous northwesterly trending diabase dykes. Proterozoic Peacock Hills concretionary argillites outcrop on the tip of the peninsula.

The area was mapped by Fraser (1964), Tremblay (1976) and Bostock (1980).

## CURRENT WORK AND RESULTS

A 112 line km, helicopter-borne EM magnetic and VLF survey was flown over the claim. A few moderately high conductors were outlined. Several magnetic anomalies are interpreted to be either iron formation or diabase dykes.
~~~

## RUSSELL LAKE — INDIN LAKE SUPRACRUSTAL BELT

The Indin Lake Supracrustal Belt is a sinuous belt of metavolcanics and metasediments, near the western margin of the Slave Province. Indin Lake is roughly 75 km north of the southern end of the belt.

An "isthmus" of metasediments joins the Indin Lake Supracrustal Belt with the Russell Lake Belt to the south.

## BUGOW CLAIMS

Cominco Ltd.
2300 - 200 Granville St.
Vancouver, B.C., V6C 2R2

Gold
85 O/4
63°11'N, 115°50'W

### REFERENCES

Lord (1942).
DIAND assessment report: 081839.

### PROPERTY

BUGOW 1-20 (396 ha).

### LOCATION

The property is 90 km northwest of Yellowknife and 45 km north of the village of Rae. Access is by float plane or by boat from Yellowknife via Frank Channel, Marion Lake and Russell Lake.

### HISTORY

The property was staked by Mr. F. Thompson in 1939 and restaked by Mr. Andy Bugow in 1945. Andrew Yellowknife Mines Ltd. acquired the property in 1946 and did sufficient work to maintain the claims in good standing until 1984. Andrew Yellowknife amalgamated with other small companies in 1954 to form Pardee Amalgamated Mines Ltd. The claims were transferred to Rio Algom Ltd. in 1962, to Highwood Resources Ltd. in 1982, and to Cominco Ltd. in 1984. The property has since been brought to lease.

### DESCRIPTION

The claims are underlain by Yellowknife Supergroup metasedimentary rocks (Lord, 1942). These include nodular schist, impure quartzite and minor amphibolitic, cherty iron formation. Nodular schist with porphyroblasts of andalusite and cordierite is the most common rock. Bedding planes and foliation both trend about 140° and dip almost vertically.

### CURRENT WORK AND RESULTS

Work done in 1984 included linecutting (17.5 line km), geological mapping (1:2000), rock sampling and magnetic surveying.

Gold on the property is associated with iron formation, which comprises amphibole-rich siliceous beds that occasionally contain garnets and up to 25% sulphides. Pyrite, pyrrhotite and arsenopyrite are the main sulphides, and locally, they assume a laminated or bedded aspect. Several distinct iron formation units have been identified on the property; these probably are separate beds rather than fold repetitions.

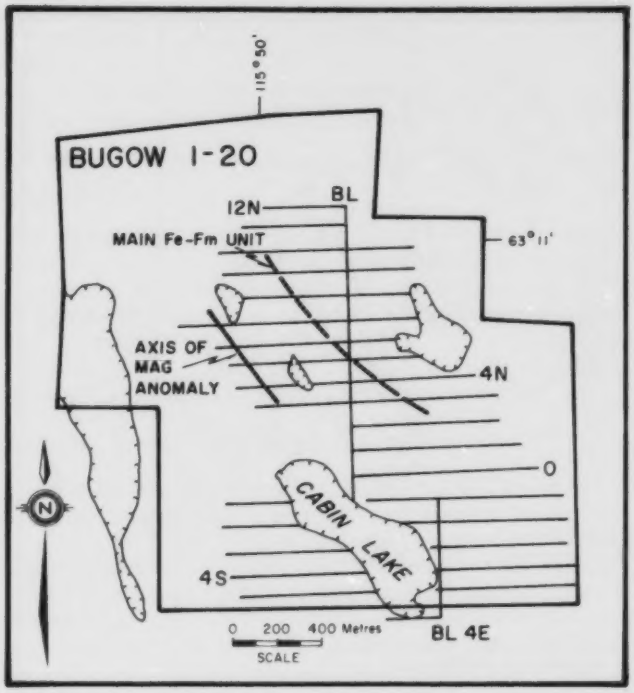



*FIGURE 8-43: BUGOW claims showing grid, magnetic anomaly and main iron - formation unit. Turbidites underlie most of the property.*

The thickest and most continuous iron formation unit (Fig. 8-43) is composed of a series of lenses, the longest of which has a strike length of 300 m and is up to 8 m wide. All samples collected from this unit assayed better than 1.0 ppm Au. The best assays were 9.6 ppm Au across 0.8 m and 7.43 ppm Au across 2.0 m. The widest chip sample assayed 1.78 ppm Au across 7.7 m.

The magnetic survey showed that there is little magnetic response over this iron formation unit. A strong magnetic anomaly ranging to 1000 gammas above background was detected about 100 m west of this main iron formation (Fig. 8-43), but the magnetic response over the remainder of the property is relatively flat.

Six holes were drilled in 1985. The Cominco option expired in 1986 and the property reverted to Highwood Resources Ltd.

## NANCY CLAIMS

Comaplex Resources International Ltd.
#901,1015-4 St. S.W.
Calgary, Alta., T2R 1J4

Gold
85 O/14
63°55'N, 115°17'W

### REFERENCES

Lord (1942).
DIAND assessment reports: 019682, 081973.

### PROPERTY

NANCY 1-2 (1359 ha).

### LOCATION

The claims are about 170 km north-northwest of Yellowknife.

### HISTORY

In 1971, Great Plains Development trenched and conducted ground geophysical surveys to evaluate an anomaly near Lil Lake (Fig. 8-44) detected by an airborne EM survey (DIAND assessment report 019682). The anomaly was caused by a 0.6 m wide quartz vein containing massive sulphides. Comaplex briefly prospected the area in 1984 and collected rock samples near Lil Lake that contained 100 to 400 ppb Au. The NANCY claims were staked on behalf of Comaplex Resources International Ltd. in May, 1985. Subsequently, 75% ownership was transferred to Petromet Resources Ltd. The claims are subject to a joint venture agreement held by Comaplex, Petromet and Echo Bay Mines Ltd.

### DESCRIPTION

The claims are entirely underlain by mafic metavolcanics of the Yellowknife Supergroup (Lord, 1942).

### CURRENT WORK AND RESULTS

A two-person crew spent six days on the property in July, 1985, to establish a small grid (Fig. 8-44) and to conduct soil and rock sampling and mapping (1:2500) surveys of the grid. NANCY 2 was also prospected. Fifty rock samples and 90 soil samples were collected and analyzed for gold and 29 other elements. No gold was detected in any of the samples. No further work was recommended.

## RA CLAIMS

Comaplex Resources International Ltd.
#901, 1015 - 4 St. S.W.
Calgary, Alta., T2R 1J4

Gold
85 0/14
63°57'N, 115°15'W

### REFERENCES

Lord (1942).
DIAND assessment reports: 019682, 081971.

### PROPERTY

RA 2-3 (397 ha).

### LOCATION

The claims are on the west shore of East Wijinnedi Lake (Fig. 8-44), about 170 km north-northwest of Yellowknife.

### HISTORY

The claims were held in 1946 by Vive Yellowknife Gold Mines Ltd., who reported low gold and copper assays. In 1971, Great Plains Development Company conducted an airborne EM survey in the Wijinnedi Lake area and detected a 6-channel anomaly at the contact between metasediments and metavolcanics on the present RA 3 claim.

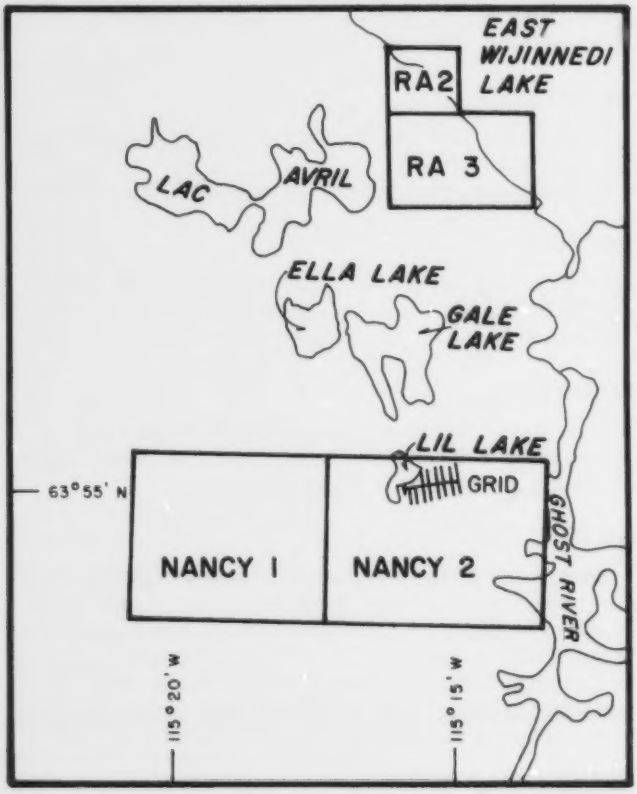



*FIGURE 8-44: NANCY and RA claims.*

The RA 2-3 claims were recorded by Comaplex Resources International Ltd. in August, 1984. Subsequently, 75% ownership was transferred to Petromet Resources Ltd. The claims are now subject to a joint venture agreement among Comaplex, Petromet and Echo Bay Mines Ltd.

### DESCRIPTION

The RA claims are underlain mainly by mafic metavolcanics of the Yellowknife Supergroup (Lord, 1942). A narrow belt of metasediments crops out along the shore of East Wijinnedi Lake.

### CURRENT WORK AND RESULTS

In 1985, a four-day program of mapping (1:10,000) and sampling was carried out. The EM anomaly was determined to be caused by a pod of graphitic argillite containing pyrite and minor chalcopyrite and arsenopyrite. Thirty-two grab samples of rock were collected and assayed for gold. Results were generally at or below the detection limit (0.03 ppm Au); the most anomalous sample assayed 0.10 ppm Au. It was recommended that no further work be done.

## OTI CLAIMS

Comaplex Resources
International Ltd.
#901 - 1015 4th St. S.W.
Calgary, Alta., T2R 1J4

Gold
86 B/3
64°09'N, 115°12'W

### REFERENCES

Lord (1941, 1942, 1951); Seaton (1984); Tremblay and others (1953).

DIAND assessment reports: 081625, 081977 to 081979.

### PROPERTY

| | |
|---|---|
| OTI 1-5 (3386 ha) | 64°13'N, 115°15'W |
| OTI 6-7 (753 ha) | 64°09'N, 115°12'W |
| OTI 8 (1045 ha) | 64°07'N, 115°15'W |

### LOCATION

The claims form three separate blocks (listed above and shown in Fig. 8-45) and are between Indin and Damoti Lakes about 210 km north of Yellowknife.

### HISTORY

Work in the thirties and forties in the Indin Lake region is summarized by Lord (1941, 1951). A detailed account of exploration in the Indin Lake-Damoti Lake area is given by Seaton (1984, p. 399-400). The OTI 1-7 claims were recorded by Comaplex Resources International Limited in 1984. OTI 8 was added in May of 1985. A 50% interest in all the OTI claims was transferred to Petromet Resources Limited in 1985.

### DESCRIPTION

The area of the claims was mapped by Lord (1942) at 1:254,440 and by Tremblay and others (1953) at 1:63,300. OTI 1-5 is centered on a northeasterly trending, 3 km wide Archean greenstone belt flanked by narrower belts of felsic volcanic rocks which are in turn flanked by metasediments. All units are steeply dipping. OTI 6-7 are to the southeast of OTI 1-5 and are mainly underlain by greenstone. OTI-8 is centered on a north-trending belt of metasediments (greywacke, argillite and metamorphic equivalents) that has been intruded by a small granodiorite pluton.

### CURRENT WORK AND RESULTS

OTI 1-5: A 128 person-day exploration program was conducted to evaluate previously discovered gold showings and to identify new areas of interest. The following work was done: 1) reconnaissance mapping, prospecting and rock sampling (243 samples); 2) construction of two major and three minor cut-line grids (117 line km, see Fig. 8-45); 3) B- and C-horizon soil geochemical sampling on the grids (1541 samples); and 4) combined ground magnetometer and VLF-EM geophysical surveying on the grids.

The reconnaissance work resulted in the rediscovery of several previously worked showings, most of which consisted of quartz veins or quartz-carbonate alteration zones in basalt. Samples from these showings were either barren or weakly mineralized with precious metals (less than 0.05 ppm Au). An exception is one sample from a narrow zone of pyritic sediment on the OTI grid (4250 S, 40 W), which assayed 20.9 ppm Au. Several new showings were found, the most significant being a series of quartz veins and silicified shears cutting granitic intrusions in the vicinity of Andy Lake (Fig. 8-45). However, the vein systems do not appear to be extensive and assays (maximum 2.4 ppm Au) were discouraging. Minor base metals were identified in iron-oxide-stained graphitic argillite within a felsic tuff package at the north end of the OTI grid.

A total of 1472 B- and C- horizon soil samples were collected over the Oti and Indin grids at 40-m intervals on lines spaced 100 m apart. Another 117 samples were collected on the Betam and Lake Lake grids. Soils were analyzed for gold, silver, molybdenum, copper, zinc, lead, arsenic, manganese, iron and antimony. Only ten samples, all on the Oti Grid, contained a detectable amount of gold (range 0.03-0.21 ppm). No clusters of gold anomalies are apparent. In general, the other elements also yielded isolated anomalies or variations related to a change in bedrock.

The geophysical surveys outlined a number of conductors and magnetic anomalies, but only one (a conductor on the Lake Lake grid) corresponded with a gold showing.

OTI 6-7: A 19 person-day exploration program on OTI 6-7 involved the following work: 1) construction of a 9.6 line km grid (Fig. 8-45) along the axis of a shear zone identified as a target for structurally controlled gold mineralization; 2) prospecting and rock sampling (42 samples); 3) soil sampling on the grid (284 samples); and 4) a VLF-EM and magnetometer survey on the grid. No gold showings were found. Two samples of carbonatized metabasalt yielded 0.33% and 0.64% Cu. Soil samples were analyzed for gold and nine other elements. Only three soil samples contained traces of gold (0.05-0.20 ppm), but these were isolated spot anomalies. One coincident VLF-EM/magnetometer anomaly was obtained over cupriferous metabasalt. Another conductor lies to the west of a gully that marks a shear. The magnetic profile across the volcanic package is generally flat.

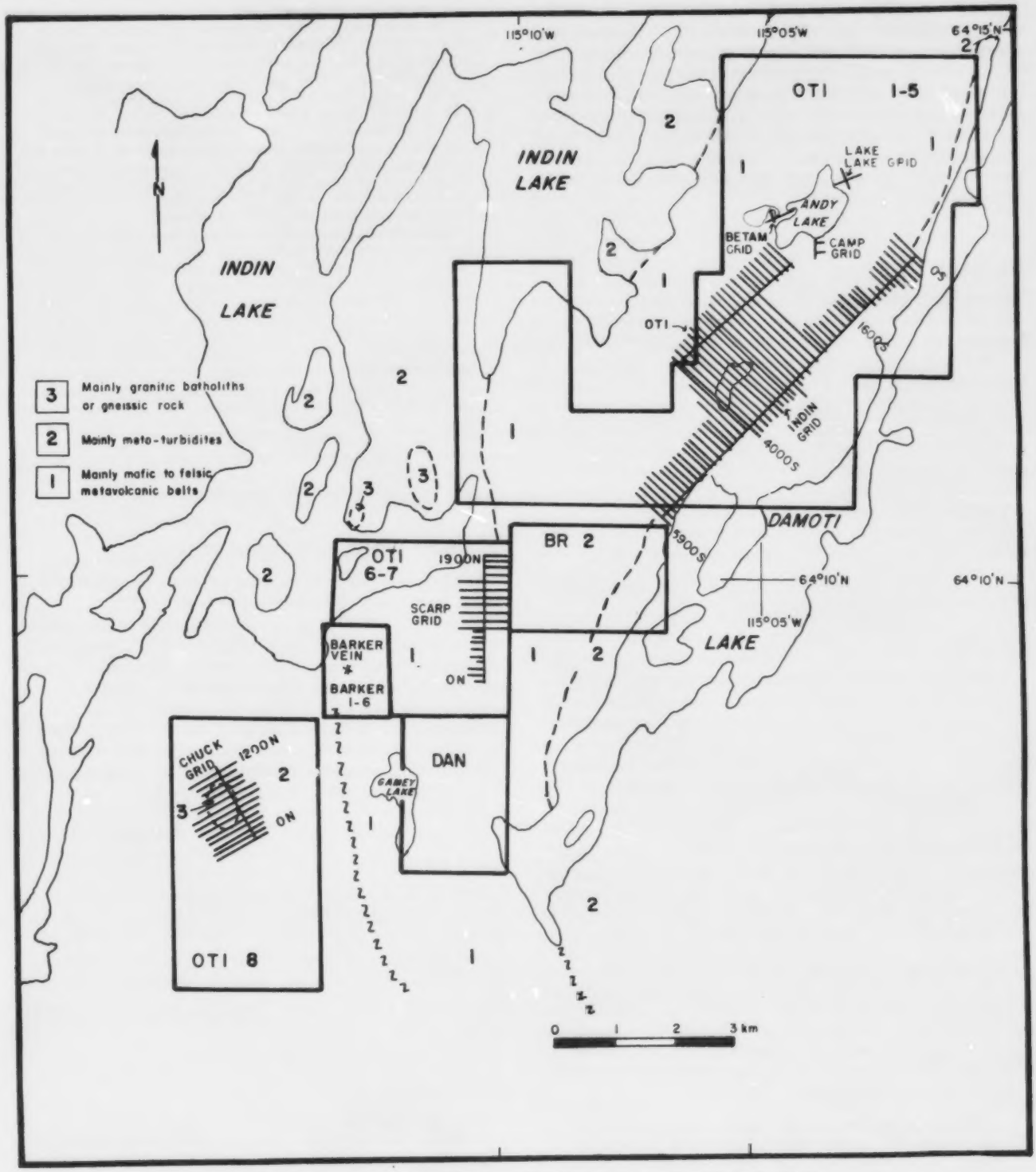



*FIGURE 8-45: Properties, showings and grids in the south Indin Lake area (geology from Tremblay and others, 1953).*

OTI 8: Work done was similar to that conducted on the other OTI claims. A grid (Fig. 8-45) totalling 13 line-km was established to cover a small plug of granodiorite intruded into Yellowknife Supergroup metasediments. The ground was prospected and eight rocks were sampled. The best assay was 0.02 ppm from a quartz vein cutting the granodiorite stock. Only two weak gold anomalies (0.03 and 0.19 ppm) were obtained from the 248 soil samples collected. These are near the granodiorite plug and are associated with a zone of arsenic-in-soil anomalies.

## BARKER CLAIMS

Frontier Gold Mines Inc.
1029 Bel-Aire Drive S.W.
Calgary, Alta., T2V 2C1

Gold
86 B/3
64°09'N, 115°13'W

### REFERENCES

Lord (1941, 1942, 1951); Tremblay and others (1953).
DIAND assessment report: 081785.

### PROPERTY

BARKER 1-6 (Fig. 8-45).

### LOCATION

The claims lie between Damoti and Indin lakes, about 210 km north of Yellowknife.

### HISTORY

The area was initially staked as the ANN and ANNA claims in 1938 to cover a gold-bearing quartz-carbonate vein called the Barker Vein. About 2.6 kg of gold was recovered from 0.72 t of ore by Territories Exploration Ltd. in 1938. The claims were restaked by the Schwerdt brothers in 1940, and an additional 7.7 kg of gold was recovered. The claims were acquired by American Yellowkife Gold Mines in 1945 and returned to the Schwerdt brothers in 1946 after a 1400 m drilling program failed to outline ore. The claims lapsed, were restaked as VIDIE 1-6 by Dave Nickerson in 1976 and were transferred to Gary Swanson in 1982 and to Frontier Gold Mines Incorporated in 1984. In 1985 the name of the claims was changed from VIDIE to BARKER.

### DESCRIPTION

The property was mapped by Lord (1942) at 1:254,440 and by Tremblay and others (1953) at 1:63,360. The claims are underlain mainly by Archean metabasalt and meta-andesite. A detailed description of the Barker Vein by Lord (1941, p. 64-65) is reproduced below:

> The rock near the vein is mostly massive, dark green, andesitic lava (greenstone) of the Yellowknife group; much of it is uniformly fine-grained, but some of it contains a few white phenocrysts or amygdules that range up to 1/2 inch across. The strike and dip of the lavas are not known. Feldspar- quartz porphyry cuts the lava and outcrops 50 feet east of the vein and in several places about 225 feet northeast of the vein. A granite body about 1/2 mile in diameter outcrops 2 miles southwest of the vein and another body about 2-1/2 miles in diameter outcrops 5-1/2 miles southeast of the vein. A major fault cuts the lavas about 1/4 mile west of the vein and strikes north 10 degrees west.
>
> The Barker vein is about 1/4 mile east of Indin Lake. The vein is 40 feet long at the surface, strikes north 25 degrees west, and dips 60 degrees (northeast). It is about 1 foot wide near the south end and gradually widens towards the north, the northern half of the vein ranging from 3 to 6 feet in width and ending abruptly in soft, grey, flaky schist. In places the rock next to the walls of the vein is strongly sheared for about 1 foot. The outcrop of the vein ended to the south against a fissure that strikes north 35 degrees west and dips 70° southwest. The fissure contains a few inches of sheared rock and gouge and may be a fault. The vein and fissure meet along a line that plunges about 35 degrees southeasterly and a pipe-like body of ore with abundant coarse gold occurred along this intersection. The pipe-like body was about 1 foot in diameter and was followed down the intersection of the vein and fissure for about 10 feet and ended at the intersection of the fissure and a vertical fracture that strikes north 75 degrees west. All ore shipped from the vein came from this body. The vein is not known to have been located south of the fissure or south of the vertical fracture. The vein material is a mixture of grey and white quartz, black and white, coarse-grained carbonate, fine-grained, white carbonate, and irregular fragments of chloritic wall-rock. Carbonate and quartz are present in about equal proportions, and the carbonate is probably calcite. Metallic minerals may constitute 2 per cent of the vein material; chalcopyrite is most plentiful and there is some galena, sphalerite, pyrite, arsenopyrite, and gold. A little cobalt bloom is reported to have occurred at the surface. Practically all known gold occurred in the pipe-like ore shoot at the south end of the vein, and the gangue in this shoot was mostly carbonate. Most of the gold is reported to have occurred in fine-grained carbonate.

### CURRENT WORK AND RESULTS

In 1984, previously excavated trenches on the BARKER claims were sampled and mapped at 1:5000 and 1:500. Thirteen grab samples of vein material were collected from trenches, outcrops and core found in the vicinity of the Barker Vein. Assay results ranged from trace to 5 ppm Au. Geological observations suggest the presence of a northeast-striking, southeast-dipping fault with gold anomalies in an associated pyritiferous quartz-carbonate vein. Previous drilling, oriented to intersect gold-bearing zones associated with a northwest-trending fault, would have missed possible zones of interest in the northeast-striking fault.

## BR 2 CLAIM

Mr. W.H. Brink
#1509, 20 Redgrave Drive
Weston, Ontario, N9R 3T8

Gold
86 B/3
64°10'N, 115°08'W

### REFERENCES

Lord (1941, 1942, 1951); Tremblay and others (1953); Seaton (1984).
DIAND assessment report: 081954.

### PROPERTY

BR 2 (627 ha, Fig. 8-45).

### LOCATION

The claim is between Damoti and Indin lakes, about 200 km north of Yellowknife.

### HISTORY

The area was staked as the DOINS claims by P.A. Schwerdt in 1939. These claims were acquired by Snowden Yellowknife Mines Ltd. in 1946. Five gold-bearing zones were discovered and evaluated by stripping, trenching and about 600 m of diamond drilling. The area was restaked as KIM 1 in 1981 by Comaplex Resources International Ltd. (Seaton, 1984, p. 401-404). Old trenches were mapped and sampled, but results were not encouraging and the claim was allowed to lapse. It was restaked as BR 2 for W.H. Brink in 1983, transferred to Noranda Exploration Company Limited in May, 1985, and subsequently returned to Mr. Brink.

### DESCRIPTION

The claim is included in an area mapped by Lord (1942) at 1:254,440 and by Tremblay and others (1947) at 1:63,360. It is underlain mainly by steeply dipping metabasalt and meta-andesite of the Archean Yellowknife Supergroup. On the eastern third of the property, the mafic rocks are flanked by a narrow (maximum 300 m thick) north-northeasterly trending belt of felsic volcanic rocks, which are flanked to the east by metasediments.

The following gold-bearing zones were discovered on the property by earlier workers (Lord, 1941):

1) Hilltop showing (64°10'N, 115°08.9'W): This is a sinuously striking (northeast to northwest) carbonatized shear containing pyrite and chalcopyrite. It has been traced for 76 m and opened by four trenches.
2) Chuck vein (64°9.8'N, 115°08.4'W): This is a northeasterly striking, 2.4 m wide, vertically dipping, milky white quartz vein cutting mafic volcanic rocks. The vein carries pyrite, chalcopyrite, and reportedly, some free gold.
3) G zone or Splash vein (64°09.9'N, 115°08.1'W): This is a northeast-trending, 9 m thick zone of irregular quartz veins containing pyrite, chalcopyrite and free gold. (Most of the drilling done in 1946-47 was concentrated here according to information on Northern Mineral Inventory sheets. However, in DIAND assessment report 081954 it is reported that most drilling was done on the Pond vein.)
4) Pond vein (76 m west of Splash vein): This is a northeast-striking zone of lenticular quartz veins cutting mafic volcanic rocks and containing pyrite, chalcopyrite and reportedly a little free gold.
5) Wally vein (on the west shore of the pond opposite Pond vein): This vein is similar to the Pond vein.

### CURRENT WORK AND RESULTS

In 1985, the claim was prospected and mapped at 1:10,000. Shear zones were mapped in detail and pre-existing trenches and pits in the shear zones were sampled. A total of 92 chip samples and 30 grab samples were analyzed for gold. Lithogeochemical analyses were done on 42 additional samples. Samples from several shear zones yielded anomalies of greater than 100 ppb Au. These shears were resampled (25 samples) and an additional 21 rocks were collected for lithogeochemical analysis. Magnetometer and VLF-EM surveys were conducted on a flagged grid in November and December.

Geological mapping confirmed that most of the claim is underlain by andesite. Several narrow (maximum 72 m) north-northeasterly trending beds of mafic fragmental tuff were identified. A relatively thick (maximum 150 m) bed of rhyolite was mapped south of the lake at the northwest corner of the claim, but the thick (300 m) felsic volcanic unit indicated by Tremblay and others (1953) across the eastern third of the property was not substantiated. Instead, there are several continuous to discontinuous felsic volcanic beds that are generally less than 50 m thick and probably aggregate not more than 100 m. The volcanic units trend 032° and dip steeply to the east. Top indicators in the volcanics, as well as in the turbidites that underlie the eastern third of the claim, indicate that the sediments overlie the volcanics.

Detailed mapping and sampling were done on the Pond and Chuck veins and Hilltop showing. On the Pond vein, lithogeochemical studies indicate limited sodium depletion and some enrichment in magnesium, potassium and calcium in sheared mafic volcanics. Of 78 chip samples taken from a grid, 11 yielded assays ranging from 100 to 2100 ppb Au. One grab sample of quartz containing chalcopyrite and pyrite assayed 91.2 ppm Au. On the Chuck vein, lithogeochemical studies indicate some sodium depletion and magnesium enrichment in sheared mafic volcanics. One anomalous chip sample (0.5 m of 870 ppb Au) and grab sample (540 ppb Au) were obtained from nine samples collected. No gold anomalies were obtained from 16 chip samples collected from the Hilltop showing.

Only one anomaly (280 ppb Au) was obtained from 18 rock samples collected during reconnaissance.

Magnetometer and VLF-EM surveys (15.4 line km) did not detect features deemed relevant to gold-bearing structures, and further work on the property was not recommended. In 1986, the claim was transferred back to Mr. Brink, who recommends that a winter VLF-EM survey be conducted on parts of the property covered by lakes (personal communication).

## DAN CLAIM

John I. Raines
Box 6596, Station D
Calgary, Alta.

Gold
86 B/3
64°10'N, 115°10'W

### REFERENCES

Lord (1941, 1942); Tremblay and others (1953).
DIAND assessment reports: 081933, 081934, 081935.

### PROPERTY

DAN 1 (502 ha).

### LOCATION

The claim is west of Damoti Lake, 210 km north of Yellowknife.

### HISTORY

The claim was staked in 1983. Signs of earlier exploration were reported, but there is no record of this activity in assessment files. The property is south of the BARKER claims

(originally the ANNA group), from which 10 kg of gold were recovered from the Barker Vein between 1938 and 1941 (Lord, 1942, see Fig. 8-45).

### DESCRIPTION

The area was mapped by Lord (1941) at 1:253,440 and by Tremblay (1953) at 1:63,360. The claim is mainly underlain by hornblende schist, hornblende-feldspar gneiss and amphibolite derived from basalt and andesite of the Archean Yellowknife Supergroup. Several northerly trending, steeply dipping felsic volcanic beds were mapped by Tremblay (1953) in the north-central part of the claim, and the volcanics are cut by several north-trending diabase dykes. Lord's (1941) map has a gold showing in the mafic metavolcanics east of Gamey Lake in the west-central part of the property, but additional information on this showing was not found.

### CURRENT WORK AND RESULTS

In 1983, an airphoto interpretation study of the property was done (DIAND assessment report 081933). In 1984, a 1:5000-scale topographic map of the claim was prepared by McElhanney Surveying and Engineering Ltd. of Vancouver (DIAND assessment report 081934). Using this map as a base, reconnaissance geological mapping and magnetometer surveys were conducted in 1985 (DIAND assessment report 081935).

The magnetometer survey was conducted on 9 east-west lines (total 10.5 line km) established by hip chain and compass. Readings were taken at 60 m intervals along lines. Two strong north-trending magnetic anomalies coinciding with diabase dykes were outlined. Twelve grab samples of quartz veins, shear zones, rusty diabase and sulphide-rich volcanics were assayed for gold. A sample of rusty diabase assayed 0.03 ppm Au, but only traces of gold were detected in the other samples.

## YUM CLAIMS

Highwood Resources Ltd.
#400 - 805 8th Ave. S.W.
Calgary, Alta., T2P 1H7

Gold
86 B/6
64°15'N, 115°23'W

### REFERENCES

Stanton and others (1954).
DIAND assessment report: 082044.

### PROPERTY

YUM 1-2 (1568 ha).

### LOCATION

The claims are in the Indin Lake area, about 210 km north of Yellowkife.

### HISTORY

No record of previous exploration on the claims is known. The property adjoins Echo Bay Mines Limited's KIM group (Fig. 8-46), where considerable drilling during the past several years has outlined a significant gold deposit hosted in veined pyrrhotite-arsenopyrite-rich, carbonatized mafic flows of the Yellowknife Supergroup. The YUM claims were staked in October, 1984.

### DESCRIPTION

The claims are underlain mainly by an east-northeasterly trending belt of mafic Yellowknife Supergroup metavolcanics (Stanton and others, 1954). This belt is flanked to the north and south by nodular schists and other highly metamorphosed sedimentary rocks.

### CURRENT WORK AND RESULTS

In 1985, a geologist and a prospector completed a 15-day program of reconnaissance sampling and geological mapping on the property. Eight rock samples were collected and assayed to check the gold content of sulphidic and quartz-rich zones identified on the property. Results indicated either trace or nil gold.

## FUR CLAIMS

Aber Resources Ltd.
#400, 805 - 8th Ave. S.W.
Calgary, Alta., T2P 1H7

Gold
86 B/6
64°18'N, 115°09'W

### REFERENCES

Lord (1951); Stanton and others (1954).
DIAND assessment report: 082041.

### PROPERTY

FUR 1-2 claims (1190 ha).

### LOCATION

The claims are north of Float Lake in the Indin Lake area, about 210 km north of Yellowknife (Fig. 8-46).

### HISTORY

The area north of Float Lake was staked as the ROLEX group by Bidd Consolidated Mines Limited in the late forties. About 39 trenches were blasted into a large (24 by 23 m) circular mass of white, glassy quartz intruding Yellowknife Supergroup greywackes and argillites about 180 m northeast of the north end of Float Lake. Some drilling was done and trenches were excavated at other locales on the property. Apparently, only low gold assays were obtained (Lord, 1951). The area was restaked as the FUR claims in October, 1984.

### DESCRIPTION

The claims are entirely underlain by a northerly trending, tightly folded succession of interbedded Yellowknife Supergroup greywackes and argillites. (Stanton and others, 1954). The Archean metasediments are cut by Proterozoic diabase dykes.

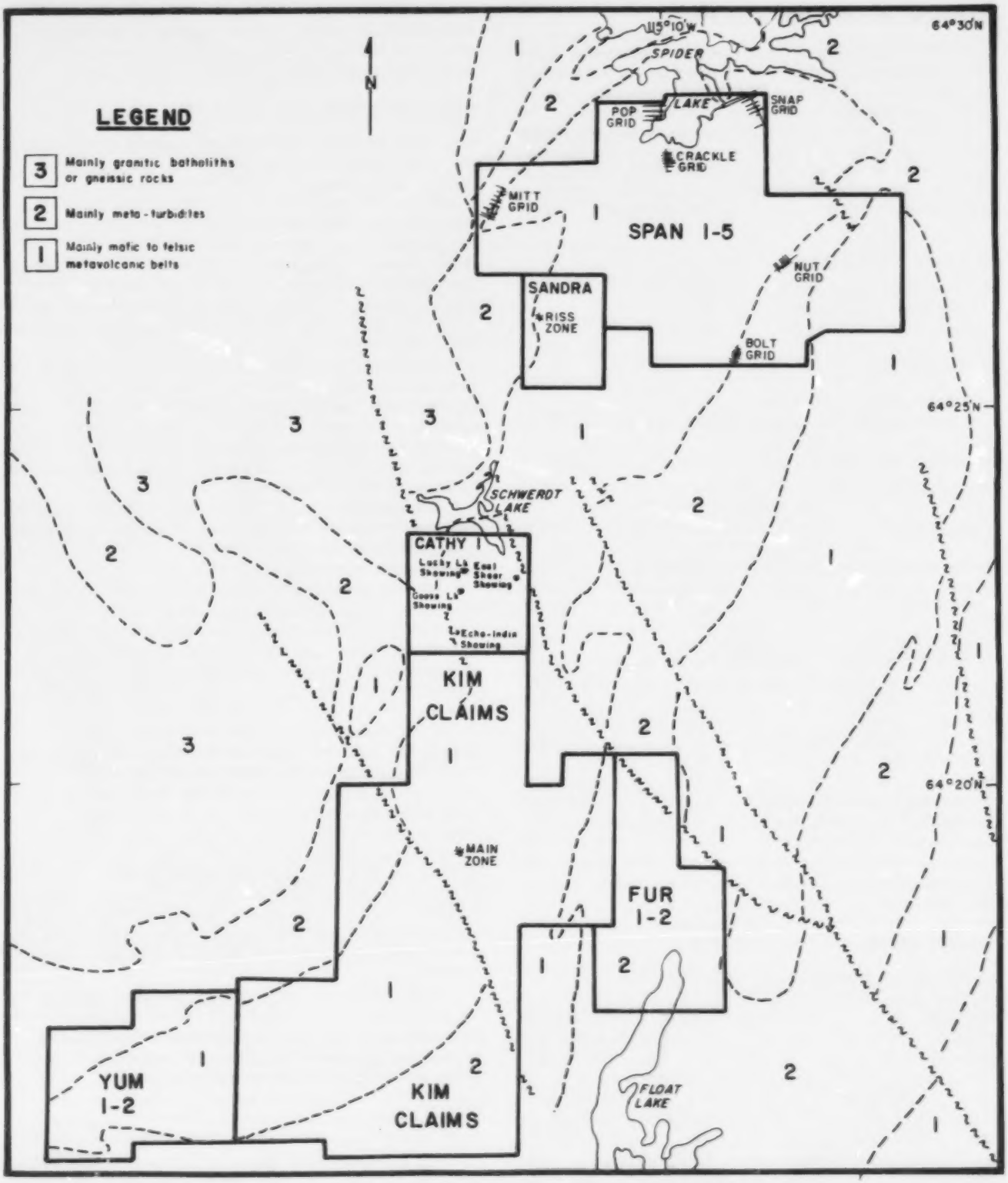



*FIGURE 8-46: Properties, showings and grids in the north Indin Lake area (geology from Stanton and others, 1954).*

### CURRENT WORK AND RESULTS

In 1985, a geologist and a prospector completed a 15-day program of reconnaissance sampling and geological mapping on the property. A total of 24 samples, mainly from quartz bodies and diabase dykes, were collected and assayed for gold. Results were trace to nil gold in all but one of the samples. An assay of 3.4 ppm Au across 3 m was obtained in an old trench, where the mineralization was described as "pyrite-pyrrhotite-chalcopyrite" associated with quartz in diabase dike' (DIAND assessment report 082041).

## CATHY 1 CLAIM

Frontier Gold Mines Inc.
1029 Bel-Air Drive S.W.
Calgary, Alta., T2V 2C1

Gold
86 B/6
64°22'N, 115°15'W

### REFERENCES

Stanton and others (1954).
DIAND assessment reports: 071253, 081784, 081893.

### PROPERTY

CATHY 1 (752 ha).

### LOCATION

The claim is about 217 km north-northwest of Yellowknife.

### HISTORY

CATHY 1 covers ground held as ECHO X 1-18 by C. Schwerdt and Conjo Yellowknife Mines Ltd. and as ECHO 1-20 by C. Schwerdt and Echo-Indin Mine Ltd. in the forties. In 1945, exploration was carried out by Trans-American Mining Corporation Ltd. Channel samples were obtained over various widths with the best assay being 31.5 ppm Au. They reportedly completed 2290 m of diamond drilling which outlined two ore shoots. Showings near Lucky Lake were staked by Falconbridge Nickel Mines Ltd. as FAG 1-17 in 1964 and probed by 334 m of diamond drilling in 1965 (DIAND assessment report 017253). No encouraging assays were reported from core. CATHY 1 was recorded for Gary Swanson in 1983 and transferred to Frontier Gold Mines Incorporated in December, 1984.

### DESCRIPTION

The claim is included in an area mapped at 1:63,360 by Stanton and others (1954). The central part of the claim is underlain by Archean hornblende schist, quartz-hornblende-feldspar gneiss and amphibolite derived from basalt and andesite. In the western part of the claim, these metavolcanic rocks are truncated by the north-northwesterly trending Lex Fault. Displacement of units suggests that there has been 2.8 km of sinistral strike-slip movement along this fault. To the west of Lex Fault are outcrops of granodiorite and amphibolite-grade metasediments. Amphibolite-grade metasediments also crop out to the east of the fault in the northwestern part of the property, whereas a belt of metasediments in the northeastern part of the claim is metamorphosed to greenschist facies. Northerly trending felsic volcanic units predominate in the southeast part of the property and along its easternmost margin. A short segment of the Wye Fault, which parallels the Lex Fault, cuts across the extreme northeast corner of the claim.

### CURRENT WORK AND RESULTS

In 1984, the claim was traversed to locate gold showings that were trenched in the 1940's. The following showings were located, mapped (1:5000), and sampled:

East Shear showing (64°22.6'N, 115°14.3'W): Three trenches cut sheared, calcareous and sometimes graphitic and talcose greywacke. The shear strikes northerly and dips vertically. Twenty-one grab and chip samples were collected from the three trenches. Sixteen assays yielded only trace gold. The best chip sample assayed 0.14 ppm Au across 0.6 m. The best grab sample assayed 1.7 ppm Au. The East Shear showing was not considered significant.

Lucky Lake showing (64°22.7'N, 115°16'W): A 7.5-m trench cuts sheared mafic metavolcanics. The shear, which trends northerly and dips 70°E, is occupied by a lenticular body of quartz and carbonate veins and veinlets carrying abundant arsenopyrite. Six grab samples of grey vein quartz containing calcite, arsenopyrite and pyrite assayed from trace to 61 ppm Au (mode approximately 8.6 ppm).

Goose Lake showing (64°22.5'N, 115°16'W): This is a shear similar to the Lucky Lake showing. Three trenches expose quartz-calcite veinlets from 5.0 cm to 1.0 m thick. Two select grab samples assayed 5.5 and 12.5 ppm Au.

Echo-Indin showing (64°21.9'N, 115°16.2'W): This showing was visited and sampled that year by Echo Bay Mines Ltd. It is described as quartz-carbonate material containing pyrite and arsenopyrite and cutting volcanics or tuffs of intermediate composition. Echo Bay reported assays of 7.95 ppm Au across 1 m and 4.66 ppm Au across 1.5 m on a continuous chip sample.

E.O. Chisholm, P. Eng., and R. Day visited the CATHY 1 claim in 1985, and also visited the KIM claim. Chisholm states that "The Echo Indin gold occurences on the CATHY 1 claim appear to be a faulted off extension of the new KIM ore body". He suggests the total length of the gold bearing shear zone on the CATHY 1 claim between Lucky Lake and the Echo Indin showings to the south could be in the order of 1220 m if continuous, and has recommended a detailed 3 phase exploration programme for the CATHY 1 claim.

Other showings: Iron-stained felsenmeer and vein quartz in sheared greywacke were sampled near the southeast arm of Schwerdt Lake. Best assay was 0.21 ppm Au in the rusty felsenmeer.

In 1985, several of the showings were resampled and a future program of grid-based geophysical and geochemical surveying was recommended. Chip sampling of the Echo-Indin showing yielded best assays of 7.95 ppm Au across 1.0 m and 4.66 ppm Au across 1.5 m.

## SANDRA CLAIM

Frontier Gold Mines Ltd.
1029 Bel-Air Drive S.W.
Calgary, Alta., T2V 2C1

Gold
86 B/6
64°26'N, 115°12'W

### REFERENCES

Stanton and others (1954).
DIAND assessment report: 081886.

### PROPERTY

SANDRA claim (502 ha).

### LOCATION

The claim is east of Riss Lake, about 225 km north-northwest of Yellowknife.

### HISTORY

Ingray Yellowknife Mines Limited was incorporated in early 1945 when it acquired the 42-claim RIS group at the east side of Riss Lake. Exploration work in 1945-46, under the direction of Trans-American Mining Corporation Limited reportedly uncovered several gold-bearing zones on which 762 m of drilling was completed. Three main gold showings, said to be in shear zones, were identified. The "Swamp" zone, containing arsenopyrite, pyrrhotite and chalcopyrite, was traced along strike for 450 m and throughout this distance gold panning samples were collected. The Main zone, 183 m north of and parallel to the Swamp zone, gave some evidence of gold and was trenched over a strike length of 152 m. The third zone, located 152 m northeast of the Main zone, reportedly yielded some excellent pannings. These zones are marked collectively as the Riss showing in Fig. 8-46. In 1976, the ground was restaked as RISS 1-12 and FN 1-12 and some trenching was done (DIAND assessment report 081886). SANDRA was recorded for W. Brink in April of 1983, transferred to Gary Swanson in June of 1985, and transferred to Frontier Gold Mines Ltd. the following August.

### DESCRIPTION

The claims are included in 1:63,360 geological mapping by Stanton and others (1954). The eastern two thirds of the property is underlain mainly by mafic metavolcanics. These are fringed to the west by a thick (maximum 600 m) unit of felsic metavolcanics. The westernmost perimeter of the property is underlain by metasediments, which overlie the volcanics.

### CURRENT WORK AND RESULTS

In 1985, one day was spent examining and sampling the Riss showing. It consists of quartz and carbonate veins and veinlets in sheared calcareous andesite. The shear has been traced by trenches for a strike distance of about 90 m and across a width of about 7 m. Four grab samples assayed trace to 0.68 ppm Au. Of six soil samples collected across the shear zone, three yielded nil gold and three yielded 5 ppb Au. Evaluation was incomplete due to time and weather limitations.

## SPAN 1-5 CLAIMS

Comaplex Resources International Ltd.
#901 - 1015 4th St. S.W.
Calgary, Alta. T2R 1J4

Gold
86 B/6
64°28'N, 115°10'W

### REFERENCES

Lord (1941, 1951); Stanton and others (1954).
DIAND assessment reports: 017382, 017734, 060413, 062065, 062141, 081980.

### PROPERTY

SPAN 1-5 (4370 ha).

### LOCATION

The claims are south of Spider Lake, aboout 230 km north-northwest of Yellowknife.

### HISTORY

The claims are in an area that has been prospected for gold since the late thirties. Most activity has been focused in the Spider Lake area immediately north of the SPAN property. Claims were held by Spinet Gold Mines Ltd. (FLY claims, 1945), Springer Sturgeon Gold Mines Ltd. (LUX, TEX, MEX, HC claims, 1945), Giant Yellowknife Mines Ltd. (JERRY claims, 1967), J.D. Mason (DAN claims, 1970) and, most recently, Treasure Island Resources Ltd. (DAN, EAEC, BOOTY, LOOT and YAK claims, 1983 to present). Further information on this earlier work can be found in Lord (1941, 1951) and in the various DIAND assessment reports listed under REFERENCES.

The SPAN claims were recorded in December, 1984 and are held jointly by Comaplex Resources International Limited and Petromet Resources Limited. The claims are currently (1985) under option to Placer Development Limited.

### DESCRIPTION

The claims are included in an area mapped at 1:63,360 by Stanton and others (1954). The property is underlain by a thick unit of mafic to intermediate metavolcanics which are locally overlain by felsic pyroclastics. The metavolcanic package is juxtaposed against high and low grade turbiditic metasediment. The assemblage is intruded by a minor amount of Archean gabbro and quartz-albite dyke rock and is cut by a suite of diabase dykes.

The structure of the area is exceedingly complex and poorly understood. The stratigraphic package appears to have been folded and faulted about several divergent axes. The result is a complicated rock distribution pattern which is best shown by the trace of the contact between the volcanic units and the stratigraphically overlying turbiditic metasediments.

Previously described gold showings in the Spider Lake area appear to be in close proximity to contacts between metavolcanic and metasedimentary units.

### CURRENT WORK AND RESULTS

The purpose of the 1985 work was to relocate and evaluate previously discovered gold showings on the property and to

identify new areas of interest. The program included: reconnaissance mapping, prospecting and rock sampling (283 samples); construction of six small grids (Fig. 8-46) over specific exploration targets (13.91 line-km); a B-C horizon soil geochemical survey on the grids (461 samples); and a combined VLF-EM and magnetometer survey on each grid.

The only significant results obtained were on the POP grid west of Spider Lake in the northwest part of the property (Fig. 8-46), where a series of old trenches expose silicified and mineralized shear zones cutting metasediments and metabasalts. Four distinct clusters of anomalous soils (up to 0.15 ppm Au) most with coincident arsenic anomalies were delineated by soil sampling (126 samples) survey on the POP grid. Nineteen trench samples from the POP grid yielded from 0.01 to 8.0 ppm Au (average 0.89 ppm). Best results were from a lenticular quartz-bearing shear zone (C-Zone) striking 120°, dipping steeply south and cutting metabasalt. The C-Zone extends 100 m and is from 0.6 to 7.0 m wide. Whole rock and minor-element analyses of 48 samples from the POP grid indicate that mineralization is associated with increases in $SiO_2$ and $K_2O$ in the country rocks and depletions in $Al_2O_3$, MgO, $Na_2O$ and $Fe_2O_3$.

In addition to gold and arsenic, rock and soil samples were also analyzed for molybdenum, copper, zinc, lead and antimony. Although isolated spot anomalies were found, including samples anomalous in more than one element, no clear-cut targets were identified as a result of this work. The geophysical surveys did not identify anomalies deemed related to gold mineralization.

## SPIDER LAKE PROJECT

Suncor Inc.
Box 38, 500-4 Ave. S.W.
Calgary, Alta., T2P 2V5

Gold
86 B/6,11
64°30'N, 115°07'W

### REFERENCES

Lord (1942, 1951); Padgham and others (1978); Seaton and Crux (1985); Stanton and others (1954).

DIAND assessment reports: 017382, 017734, 019699, 062065, 062141, 081928.

### PROPERTY

BOOTY 1; DAN 9,13,14,19; EAEC 1; JOHN; KEN 1; LONG; LOOT 1; MIDAS; MIDAS 1-3; PEGLEG 1 and 2; POLLY; RON 1; YAK 1 and 2.

### LOCATION

The claims form a single block at Spider Lake (Fig. 8-47). They are 235 km north-northwesterly from Yellowknife.

### HISTORY

In 1939 and 1940, the Ingray Lake area was mapped by the Geological Survey of Canada at 1:253,400 (Lord, 1942).

Gold was discovered in the Spider Lake area in 1945. That year the FLY No. 1 and FLY No. 2 groups were staked for Trans-American Mining Corporation Ltd. and the H.C., LUX, MEX and TEX claim groups for Springer Sturgeon Gold Mines Ltd. Trenching and sampling were performed by both companies (DIAND assessment reports 017382, 062065) in the fall of 1945. Spinet Mining Company Ltd. acquired the Trans-American and Springer Sturgeon claims in January 1946 and was succeeded by Spinet Gold Mines Ltd. in October 1946.

In 1946 and 1947, Spinet Gold Mines explored their property mainly by diamond drilling (DIAND assessment report 017382). Of a total of 5550 m drilled, 5026 m were to explore the North, South and East Zones, which are near the southernmost point of Treasure Island (Lord, 1951).

According to Lord (1951), drilling on the North Zone to a depth of 55 m (180 feet) indicated an ore shoot 23 m (75 feet) long with an average width of 2.6 m (8.5 feet) grading 7.9 g/t Au (0.231 oz/ton). The South Zone was drilled to a vertical depth of 107 m (350 feet) and an ore shoot 100 m (325 feet) long averaging 0.91 m (3 feet) wide grading 37.7 g/t Au (1.1 oz/ton) was indicated. The East Zone, 305 to 549 m (1,000 to 1800 feet) east of the South Zone, was reported to have been explored by a few drill holes, sections of which were auriferous.

Relatively little work was done on the Spinet Gold Mines property for the next two decades.

In 1960, the DAN group, on and south of Treasure Island, was staked and acquired by M.O. King. In 1963, the claims were transferred to Jason Holdings Ltd., which held most of them till October 1979. DAN 9, 13, 14, 19, which had been converted to a mining lease in 1972, were transferred to J.D. Mason in 1979. An airborne radiometric survey of DAN 9, 10, 13, 15, 19, 20, 23, and DAN X was performed in 1969 (DIAND assessment report 060413). Certificates of work were issued to Jason Holdings at various times but no record of this work remains in DIAND assessment files. The DAN lease was assigned to Suncor Inc. in 1985.

In 1967, Giant Yellowknife Mines Ltd. staked 18 JERRY claims west of Treasure Island on ground subsequently staked as the LONG and PEGLEG claims. Giant Yellowknife Mines mapped and sampled the peninsula east of Treasure Island and an area at the eastern end of Laurie Lake (DIAND assessment report 017734).

In 1970, Seigel Associates Ltd. flew a geophysical survey of the Damoti Lake-Indin Lake-Spider Lake area for Freeport Oil Company (Alberta) Ltd. to delineate volcanogenic massive sulphide targets. Several targets were outlined and secured by claim staking. These targets included one staked as the PETER claims (covering part of the ground earlier staked as the LUX and HC groups) at the south end of Spider Lake. One hole was drilled on the PETER claims (Padgham and others, 1978; DIAND assessment report 019699) which adjoined and lay south of the area now occupied by the PEGLEG 1 and YAK claims.

In 1980, Treasure Island Resources Corporation Ltd. calculated reserves from Spinet Gold Mines' 1946 and 1947 drilling to be 72,443 t (79,855 tons) grading 15.5 g/t Au (0.453 oz/ton Au). Treasure Island Resources Corporation recorded EAEC 1 in October 1978, BOOTY 1 in December 1979 and LOOT 1 in February 1980, and optioned DAN 9, 13, 14, 19 (DAN lease) and the YAK 1 and 2 (recorded January 1980) from J.D. Mason. In March 1983, Treasure Island Resources Corporation drilled eight holes totalling 920 m in the North and South Zones on Treasure Island.

From drill-core assays a reserve of 103,831 t (114,455 tons) grading 14.1 g/t Au (0.411 oz/ton Au) was calculated, with an additional 34,000 tons (30,845 t) grading 4.4 g/t Au (0.128

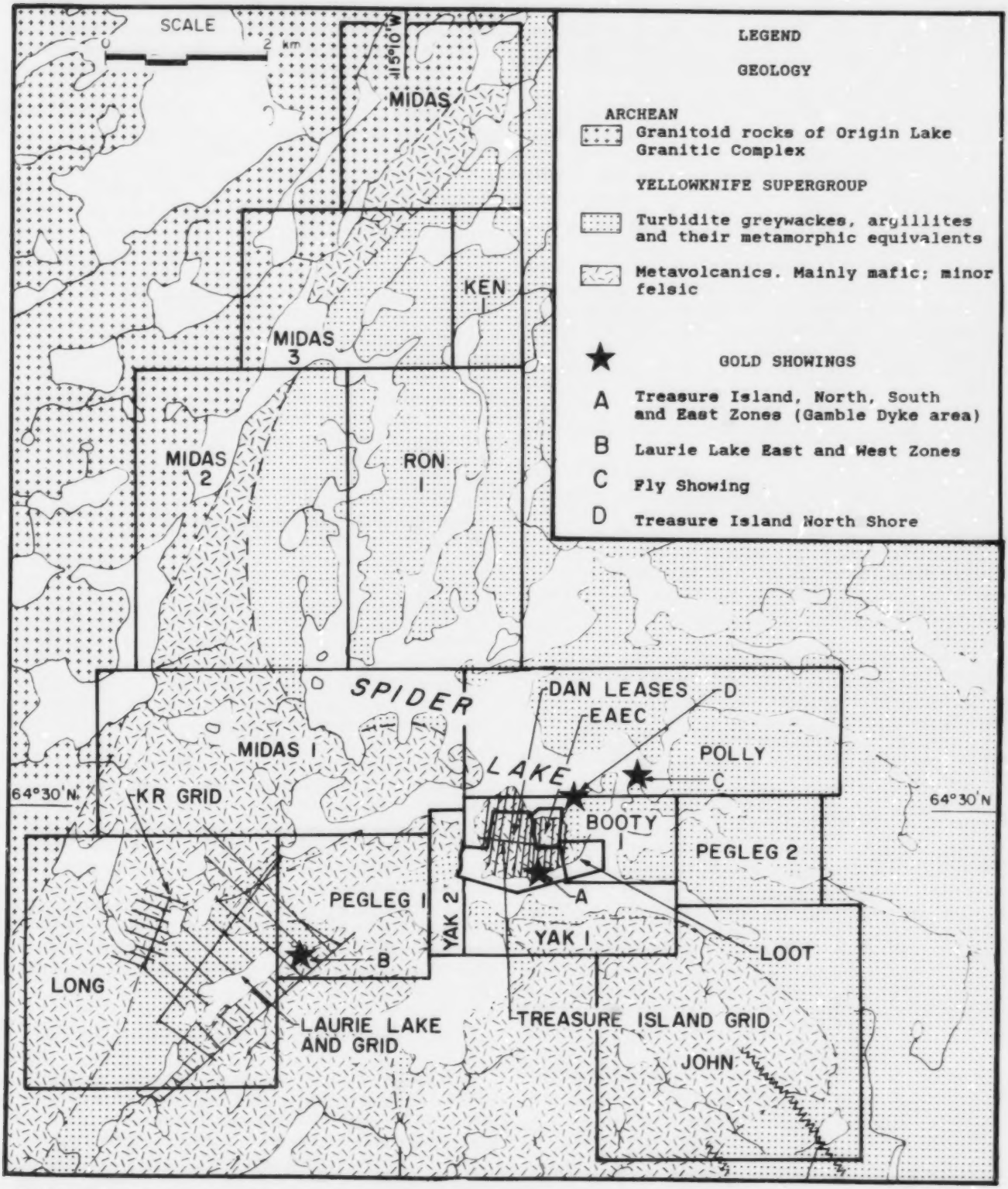



*FIGURE 8-47: Geology and properties of the Spider Lake area (geology compiled from Stanton and others, 1954 and assessment reports).*

oz/ton Au). Treasure Island Resources Corporation recorded PEGLEG 1 and 2 in January 1983 and LONG and JOHN in April 1983. They geologically reconnoitred EAEC 1 during the spring of 1983 (Seaton and Crux, 1985).

In May 1985, Suncor Inc. optioned the Treasure Island Resources Corporation property. Suncor recorded POLLY in April 1985, MIDAS 1-4 in June 1985 and KEN 1 and RON 1 in August 1985.

### DESCRIPTION

Metasediments of the Yellowknife Supergroup underlie the northern arms of Spider Lake on KEN 1, RON 1, POLLY and PEGLEG 2. A belt of metasediments, less than 2 km wide flanked by metavolcanics, diverges from the main exposure (north and east of Spider Lake) and trends westerly to southwesterly through the southern part of Spider Lake and southwesterly through PEGLEG 1 and LONG. Much of the central (Treasure Island) and western parts of Spider Lake area are underlain by metavolcanics, flanked by metasediments to the southeast and granitoid rocks to the northwest. The granitoids underlie parts of LONG and MIDAS 1-4 on the northwestern border of the property.

The metavolcanic rocks in the Spider Lake area are predominantly mafic. Felsic volcanics have been mapped (Stanton and others, 1954) only on JOHN and YAK 1 and the northwestern part of LONG.

Structure in the Indin Lake-Spider Lake area is complex. Outcrop patterns of metasediments and volcanics suggest two or more periods of folding, modified by northeasterly striking and later (probably Proterozoic) northwesterly striking faults.

The North and South Zones (Lord, 1951) lie north and south respectively of the Gamble Dyke, an albite-porphyritic dyke that trends east-northeasterly through the southern point of Treasure Island. The dyke dips at 75°-85° to the north, is 6 to 12 m wide, and has been traced for about 455 m. It lies between metavolcanics to its north and metasediments to its south.

### CURRENT WORK AND RESULTS

During 1985, Suncor explored the Spider Lake property by prospecting, linecutting, geological mapping, VLF-EM and magnetic surveys, sampling and trenching. A DIGHEM airborne geophysical survey was flown over most of the property. Three grids were constructed (Fig. 8-47); one on Treasure Island, and two to the west of Spider Lake on PEGLEG 1 and LONG (Laurie Lake and KR grids). A total of 49 line km of grid was cut. Grids were geologically mapped and explored by 30 line km of magnetic surveying, and 39 line km of VLF-EM, using both Seattle, Washington and Cutler, Maine transmission stations.

Over 430 rock samples were taken. Most were analysed for gold only; a few for gold and silver. Samples with analyses of over 1000 ppb Au were repeated by fire assay.

Prospecting beyond gridded areas resulted in discovery of two systems of northeasterly trending quartz veins near the eastern boundary of MIDAS 2. RON 1 and KEN 1 were staked to protect these.

Rock sampling on grids confirmed the presence of low concentrations of gold (mostly less than 2 g/t Au) in samples from gold showings trenched in the forties and resulted in discovery of a weakly auriferous zone near the northern shore of Treasure Island. Two trenches were excavated on this zone. Approximate locations of the various showings are shown in Figure 8-47.

Geological mapping by Suncor revealed that most of the gold showings are near or at the contact between metasediments and metavolcanics and that rocks near auriferous zones have generally been silicified. Biotite is abundant in the metavolcanics near their contact with metasediments at the main Treasure Island showings (near the Gamble Dyke) and at the Laurie Lake showings, where garnets were noted locally in volcanics adjacent to auriferous zones. Chlorite, actinolite and locally garnets were noted at the showing on the north shore of Treasure Island and at the East Zone.

Alteration, affecting both metavolcanics and metasediments for a distance of 10 to 15 m from the contacts of the Gamble Dyke is particularly conspicuous in the metavolcanics that have been converted to a chlorite-hornblende-biotite gneiss. Lord (1951) describes a 12 to 45 m wide unit of feldspar-amphibole-biotite gneiss adjoining amphibolite (metavolcanics) to the south. This unit presumably corresponds, at least in part, to the gneissic alteration zone described by Suncor.

Graphitic argillite is common (as elsewhere in the Indin Lake and other volcanic belts in the Slave Structural Province) at the metavolcanic- metasediment contact and commonly contains disseminated sulphides. The graphitic argillite in the Spider Lake area gives rise to EM, VLF-EM, resistivity and, locally, magnetic anomalies. Other features giving geophysical anomalies are: a carbonate unit bordered to the south by a slaty gossan-capped zone, in an area underlain by nodular quartz-biotite schist (metagreywacke) in the southwestern part of the Laurie Lake Grid; and, in the eastern corner of the same grid, a zone of magnetite-bearing iron formation that trends west-southwesterly.

A DIGHEM (magnetic, EM, VLF-EM, resistivity) survey was flown over most of the property, along flight lines oriented due north in the southern part of the property and northwesterly in the northern part. Long formational conductors delineated by the EM surveys followed major structural trends within metasediments or within metavolcanics near their contacts with metasediments.

The conductors are in part coincident with magnetic highs. Structural trends are also reflected in the resistivity data. Resistivity results also suggest that certain predominantly volcanic areas might contain thin, unmapped, metasedimentary units.

## YELLOWKNIFE SUPRACRUSTAL BASIN

The Yellowknife Supracrustal Basin as defined by Padgham (1981) includes marginal volcanic belts (including the Yellowknife and Beaulieu River-Cameron River volcanic belts) and an extensive area of greywacke-mudstone turbidites and their metamorphic equivalents deposited distally to the volcanic belts. The basin includes granitoid plutons which intrude the supracrustal rocks; the larger ones having lobate outlines. The basin is bordered by Great Slave Lake to the south and gneissic terrain to the north.

The volcanic belts marginal to the basin host gold deposits and silver-base metal deposits. The turbidite sediments that fill most of the basin and the granitic rocks that intrude them host auriferous quartz veins and rare metal pegmatites.

## BET, BIN, HID, LENS AND MUT CLAIMS

Equinox Resources Ltd.
500-576 Seymour St.
Vancouver, B.C., V6B 5K1

Tantalum, Niobium, Lithium
85 I/1,2,7
62°13'N, 112°42'W

### REFERENCES

Henderson (1985); Jolliffe (1944); Kretz (1968); Lasmanis (1978); Rowe (1952); Seaton (1978); Wise and others (1985).
DIAND assessment reports: 080278-080280; 081132, 081875-081879.

### PROPERTY

| Name | ha | NTS | Lat.-Long. |
|---|---|---|---|
| BET 1-2 | 42.8 | 85 I/1 | 62°13'N, 112°18'W |
| BIN 1 | 18.6 | 85 I/2 | 62°13'N, 112°45'W |
| HID 1 | 21.6 | 85 I/7 | 62°18'N, 112°48'W |
| LENS 1 | 21.7 | 85 I/2 | 62°12'N, 112°41'W |
| MUT 1 | 19.1 | 85 I/2 | 62°13'N, 112°42'W |

### LOCATION

The claims are 87 to 112 km east-southeast of Yellowknife.

### HISTORY

The claims are named after the rare-element-bearing pegmatites that they cover. These pegmatites have been explored since the early forties and have been the subject of numerous studies, including those by Jolliffe (1944), Kretz (1968), and Rowe (1952). One of the pegmatites (Bet pegmatite) was mined intermittently between 1958 and 1964 (Seaton, 1978). The lithium in these pegmatites is contained mainly in spodumene. Lasmanis (1978) estimated their lithium resource to a projected depth of 152 m as follows:

| Pegmatite | Tonnes | Grade $Li_2O$ |
|---|---|---|
| Lens | 93,076 | 1.97% |
| Bin | 89,901 | 1.75% |
| Hid | 45,722 | 1.70% |
| Bet | 38,737 | 2.00% |
| Mut | 22,317 | 2.20% |

Wise and others (1985) studied the tin, niobium and tantalum contents of these pegmatites and reported that only the Bet pegmatite carries tantalum and niobium-bearing minerals (ferrotantalite and ferrocolumbite respectively).

The claims were staked in 1975 and transferred to Canadian Superior Explorations Ltd. The BET claims were transferred to Cominco in 1980, to Erex International Ltd. in 1983, and to Equinox Resources Ltd. in 1985. The other claims were transferred to John Vincent in 1982 and to Equinox Resources Ltd. in 1985.

### DESCRIPTION

The pegmatites are hosted in metasediments of the Yellowknife Supergroup (Henderson, 1985).

### CURRENT WORK AND RESULTS

Trenches in the pegmatites were cleaned and examined for tantalum-bearing minerals, which were noted only in the Bet and Bin pegmatites. About 64 $m^3$ of overburden and rubble were removed from eight trenches.

## BRANDY 1 CLAIM

Genesis Resources Corp.
#405-319 W. Pender St.
Vancouver, B.C., V6C 1T4

Gold
85 I/7
62°25'N, 112°55'W

### REFERENCES

Henderson (1985); Lord (1951).
DIAND assessment report 081798.

### PROPERTY

BRANDY 1 (62.7 ha).

### LOCATION

The claim is northeast of Hansen Lake, 80 km east of Yellowknife.

### HISTORY

The property was staked in 1939 as NORMA 1-12 and acquired by Norma Tungsten and Gold Mines Ltd. About 14 t of high-grade ore from two pits on the Norma Vein were reportedly milled in 1942. In 1945 the property was acquired by Beaulieu Yellowknife Mines Ltd. Drilling in 1945-46 indicated 12.7 kt of ore grading 34 g/t Au in the A Zone. A shaft was sunk in 1947, and further development work indicated reserves of 95 kt grading 34 g/t Au. Milling commenced in October, 1947, and ceased about a month later when it became apparent that tonnage and grades were vastly overestimated. Lord (1951) reported that 230 t of milled ore yielded 230 g of gold for an average grade of 1 g/t Au. Another two-month mining attempt was made in 1948 when 190 t of ore yielded only 1.27 kg of gold for an average grade of 6.7 g/t Au. In 1949 the property was optioned to Treasure Island Corporation, but no work was done and the claims were allowed to lapse. They were restaked as BRANDY 1 in 1981 and transferred several times, most recently in 1983 to Genesis Resources Corporation.

### DESCRIPTION

BRANDY is underlain by greenschist grade meta-turbidites of the Yellowknife Supergroup, (Henderson, 1985). The strata are well bedded and intricately folded. The Norma Vein, which appears to be a stratabound or stratiform quartz vein wrapped around the nose of an anticlinal structure was described by Lord (1951) as follows:

The Norma quartz vein outcrops on Norma No. 9 claim for a possible length of 1,800 feet. In plan it has the form of a large 'U', open to the north, with one major irregularity in curvature in its southern part. The eastern part of the vein trends southerly, lies about 70 feet west of the shaft, and has been traced, with some uncertainty and at scattered intervals, about 450 feet to a point 150 feet south-southwest of the shaft. Thence it bends abruptly westward and has been traced with reasonable certainty for 1,350 feet, first through successive courses of northwest, west, and southwest, then through an abrupt bend to the west, and thence finally through a long comparatively smooth curve to nearly north. The northeast and northwest ends of the vein outcrop pass beneath overburden. The vein averages 6 inches or less in width and rarely exceeds 18 inches. Throughout much, and possibly most, of its known length it lies within or at the top of a slate band, a few inches to 1 foot thick, that grades stratigraphically downwards into several feet of increasingly coarse-grained schistose greywacke. Thus, where the vein trends about west, as near pits "A" and "B" where the vein and beds dip northerly and the latter are overturned, the hanging-wall is slate or slaty greywacke of the vein-bed, and the foot-wall is a thin parting of slate of the same bed or coarse, basal greywacke of the contiguous, younger bed. Underground exploration showed the vein to be about 16 feet wide for a length of about 50 feet on the 175- and 300-foot levels.

The vein is composed mainly of rusty grey quartz, which, although greatly contorted, drag-folded, and fractured, precisely parallels the accompanying similarly distorted slate layer. Other narrower and shorter, but parallel and otherwise similar veins are common between the adjacent strata. The walls are generally sharply defined and not notably sheared. The quartz contains various proportions of black slaty rock, and a little carbonate, feldspar, scheelite, biotite, and chlorite. Specimens from the extreme northwest end of the exposed vein contained a few colourless hexagonal crystals identified as fluorapatite. A minute crystal of, probably, monazite was found embedded in the fluorapatite. Metallic minerals comprise much less than 1 per cent of the vein; pyrite is most plentiful, and others include arsenopyrite, galena, chalcopyrite, marcasite, spalerite (?), pyrrhotite (?), and gold. Much of the pyrite and most of the arsenopyrite occur as scattered crystals in the wall-rock and in inclusions of this rock. Visible gold is commonly associated with galena and other sulphide minerals.

Younger, coarse milky white or glassy quartz cuts the grey quartz of the Norma and parallel veins. It also transects the adjacent strata as veinlets that parallel the foliation, or as irregular bodies and interlacing veinlets concentrated near the axial parts of folds. This quartz is less fractured and contains more feldspar than the grey quartz. It contains a little pyrite, but is not known to contain significant amounts of gold.

The principal known concentrations of gold in the Norma vein are in the "A" ore shoot, 190 feet southwest of the shaft, and at "B" pit 630 feet farther west. The "A" ore shoot outcropped at "A" pit on the southwest flank of a sharp anticlinal fold, and at the surface lies 70 feet west of the axis of this fold. The orebody and vein strike west-northwest and dip about 70 degrees north-northeast. The plunge of the orebody parallels its dip. At the surface the shoot is 8 feet long, averages 16 inches in width, and is reported to contain 1.64 ounces of gold a ton; on the 175-foot level it has a drift length of 23 feet, averages 15 inches in width, and contains 0.55 ounces of gold per ton. Much greater widths of quartz have been exposed underground, as previously mentioned, but are not ore. No ore has been encountered on the 300-feet level although a little gold has been seen. Much of the slaty hanging-wall rock has been altered to a chloritic schist with which the quartz is in sharp contact. On the north wall of the "A" pit this schist outcrops as a rusty band 6 to 18 inches wide but probably ends a few feet east of the pit and ore shoot. The foot-wall rock is commonly a micaceous greywacke and, because it has been partly replaced by quartz, locally appears to grade into the vein quartz. Most of the visible gold is close to hanging-wall slate and schist or near inclusions of slate, and some occurs in chloritic seams in these inclusions. The notably sheared hanging-wall appears to be a feature confined to the vicinity of the ore shoot. Another structural feature unique to this part of the vein is a loop-like fold involving the beds immediately southwest of the ore shoot. The strata are here greatly contorted and broken, and the details of the structure are further obscured by numerous stringers and irregular bodies of milky quartz; nevertheless, the outcrop diameter of this loop-like structure may be about 60 feet. Possibly the presence of "A" orebody should be attributed, in part at least, to these two local structures.

At "B" pit the vein strikes west-northwest, and dips about 70 degrees north-northeast. Surface sampling by the owners indicated that approximately 40 feet of the vein averages 1 foot in width and contains more than 1 ounce of gold a ton. Diamond drill-holes in this vicinity probed the vein at shallow depths but, although some high-grade quartz was encountered, failed to outline a commercial orebody.

### CURRENT WORK AND RESULTS

During March of 1984, two holes totalling 183 m were diamond drilled to confirm wide, high-grade gold intersections in the A Zone, as reported by Beaulieu Yellowknife Mines in 1946-47. Both holes intersected gold-bearing quartz veins, but grades and widths were far less than those reported by Beaulieu. The intersections are:

| Hole # | Intersections | Width | Grade Au |
|---|---|---|---|
| 84-1 | 82.0 m-82.9 m | 0.9 m | 1.99 g/t |
| 84-21 | 66.1 m-67.0 m | 0.9 m | 2.81 g/t |

The gold is associated with grey vein quartz and minor (less than 1%) pyrite.

## WEAVER LAKE PROJECT

Noranda Exploration Co. Ltd.
P.O. Box 45
Commerce Court W.
Toronto, Ont., M5L 1B6

Base metals, Silver, Gold
85 I/9,10,11,15,16
62°30'N-62°52'N
112°14'W-113°07'W

### REFERENCES

Henderson (1985); Padgham and others (1975).
DIAND assessment report: 081985.

### PROPERTY

| Claim | ha | NTS |
|---|---|---|
| BETH | 585 | 85 I/10 |
| BRIAN | 439 | 85 I/10 |
| CATH | 418 | 85 I/10 |
| FIDO | 42 | 85 I/10 |
| FIR 1-7 | 2154 | 85 I/16 |
| JAN | 251 | 85 I/10 |
| JUD | 502 | 85 I/11 |
| KRAW | 376 | 85 I/10 |
| LONG 01-03 | 1296 | 85 I/9,10,15,16 |
| MIKE | 314 | 85 I/11 |
| MOE | 397 | 85 I/10,11 |
| NORMA | 84 | 85 I/10 |
| PEG | 125 | 85 I/10 |
| SNOOT 1-2 | 669 | 85 I/11 |
| SUE 1 | 251 | 85 I/10 |
| TORK 1-2 | 192 | 85 I/10 |
| VIC 01 | 188 | 85 I/11 |
| XXX 01-04 | 732 | 85 I/10 |

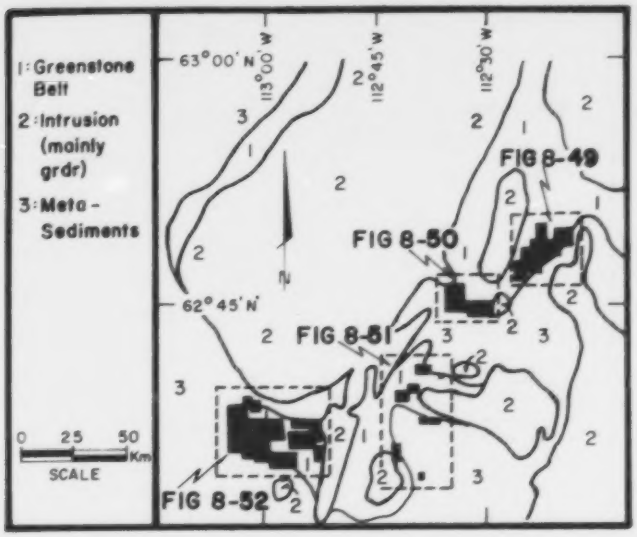



*FIGURE 8-48: Index to Figures 8-49 to 8-52 (geology from Henderson, 1985).*

## LOCATION

The claims are in the northeast quadrant of NTS 85I is shown in Figure 8-48. The centre of the project area is about 100 km northeast of Yellowknife.

## HISTORY

The area was prospected in the thirties for gold. Sulphides were discovered in the Turnback Lake area in 1937 and properties were explored by Westfield Minerals Ltd. (1939), Cominco (1951) and the Yellowknife Syndicate (1970) (Padgham and others, 1975). EM surveys were flown over the area in the early seventies by Teck Corporation and Great Plains Development, but little follow-up was done before operations were suspended. Since then, several junior companies have conducted small exploration programs. The Weaver Lake Project claims were staked by Noranda between September and December of 1983. Property selection was based on analysis of AEM anomalies from the 1971 Great Plains input survey and on the results of a prospecting survey conducted by Noranda in 1983.

## DESCRIPTION

The claims are underlain by the Detour-Turnback lakes and Beaulieu River greenstone belts (Henderson, 1985; Fig. 8-48). These consist mainly of mafic volcanic rocks with subordinate felsic volcanics and minor interbedded metasediments. Most of the claims are centred on areas of felsic volcanic rocks.

## CURRENT WORK AND RESULTS

AEM conductors from the 1971 Great Plains survey were ground checked by running lines of gravity, magnetometer and HLEM surveys. Magnetometer and HLEM surveys were conducted on detailed grids on the SUE and XXX 04 claims. Five holes totalling 400 m were drilled to test highest priority ground geophysical targets. Grids, survey lines, and diamond drill holes are shown in Figures 8-49 to 8-52.

The most significant results from drilling are as follows: hole K-1-84 on the SUE claims intersected 3.5 m of 0.4% Zn and 10.28 ppm Ag; hole A-1-84 on the SNOOT 1 claim intersected 8 m of 0.36% Zn, and hole C-1-84 on CATH intersected 0.5 m of 1.34 ppm Au.

# MIK CLAIM

Ardic Exploration and Development Ltd.
65 Broadway, 6th Floor
New York, NY, USA, 10006

Gold
85 I/11
62°26'N, 113°26'W

## REFERENCES

Henderson (1985); Schiller (1964).
DIAND assessment reports: 081351, 081774.

## PROPERTY

MIK claim (83.6 ha).

## LOCATION

The claim is 48 km east-northeast of Yellowknife.

## HISTORY

The property was staked by Partridge Yellowknife Gold Mines Ltd. as the LUN group in the late thirties. In 1938, Thompson-Lundmark Gold Mines Ltd. was formed and the property became part of their holdings. They sampled two gold showings on the property, the Partridge and the Lun veins. Thompson-Lundmark Gold Mines Ltd. allowed the portion of their property now covered by MIK to lapse. In the fifties, the property was staked as the PLUTO group (Schiller, 1964). Subsequently it was staked as the WIN and GAY group by Mr. Avery, who excavated trenches and sampled the Partridge Vein (#1 Showing). From these trenches 9 bulk samples of unknown size and 40 chip samples were collected and assayed. Prior to the staking by Avery, some work was done on a third gold showing straddling the south boundary line of the property. Considerable trenching was done and at least two holes were drilled. No additional information is known of this work. The property was restaked by Dave Nickerson as the MIK claim in September 1979. In 1981, the old pits and trenches were cleaned out, mapped and sampled. Of 51 chip samples assayed, only 3 exceeded 8.6 ppm Au (maximum 72.7 ppm) and 42 were less than 3.4 ppm (DIAND assessment report 081351).

## DESCRIPTION

The claim is underlain by amphibolite-grade metaturbidites of the Yellowknife Supergroup (Henderson, 1985). Strata trend 130° to 170° and dip uniformly to the east at 40° to 60°. On the eastern boundary of the property, there are indications of an isoclinal fold with closure to the south and an overturned curvilinear axial surface. The sediments are cut by pegmatite dykes and at least two generations of quartz veins. The auriferous veins generally are conformable to bedding. Barren veins occupy joints that are sub-parallel to bedding

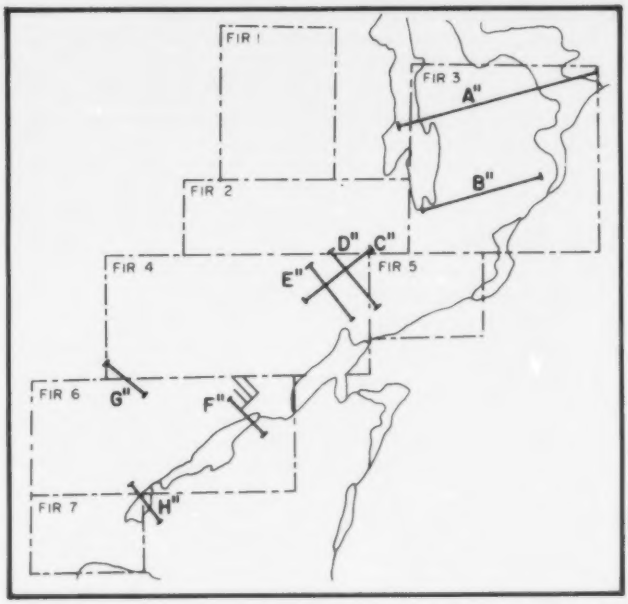



*FIGURE 8-49: Grids and geophysical traverses, FIR claims. See Figure 8-48 for location.*

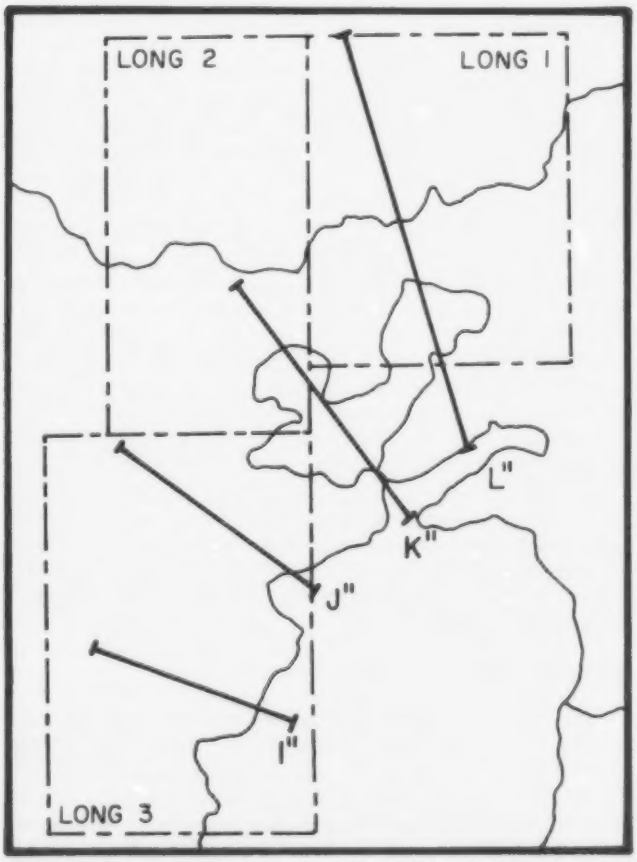



*FIGURE 8-50: Geophysical traverses on the LONG claims. See Figure 8-48 for location.*

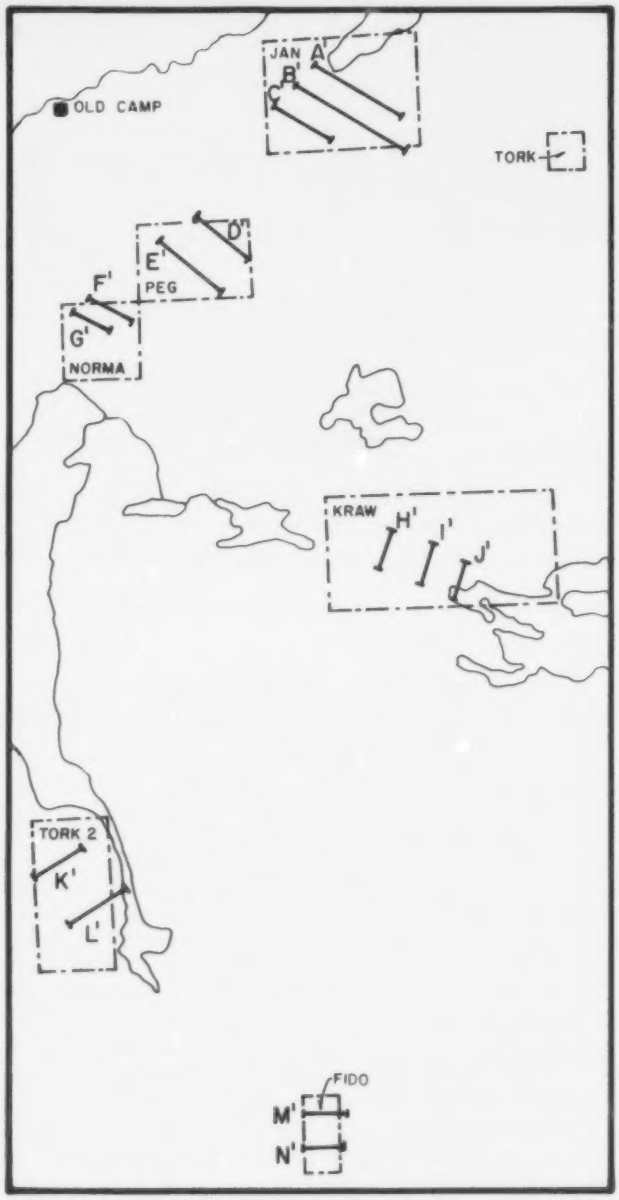



*FIGURE 8-51: Geophysical traverses on the JAN, PEG, NORMA, KRAW, TORK and FIDO claims. See Figure 8-48 for location.*

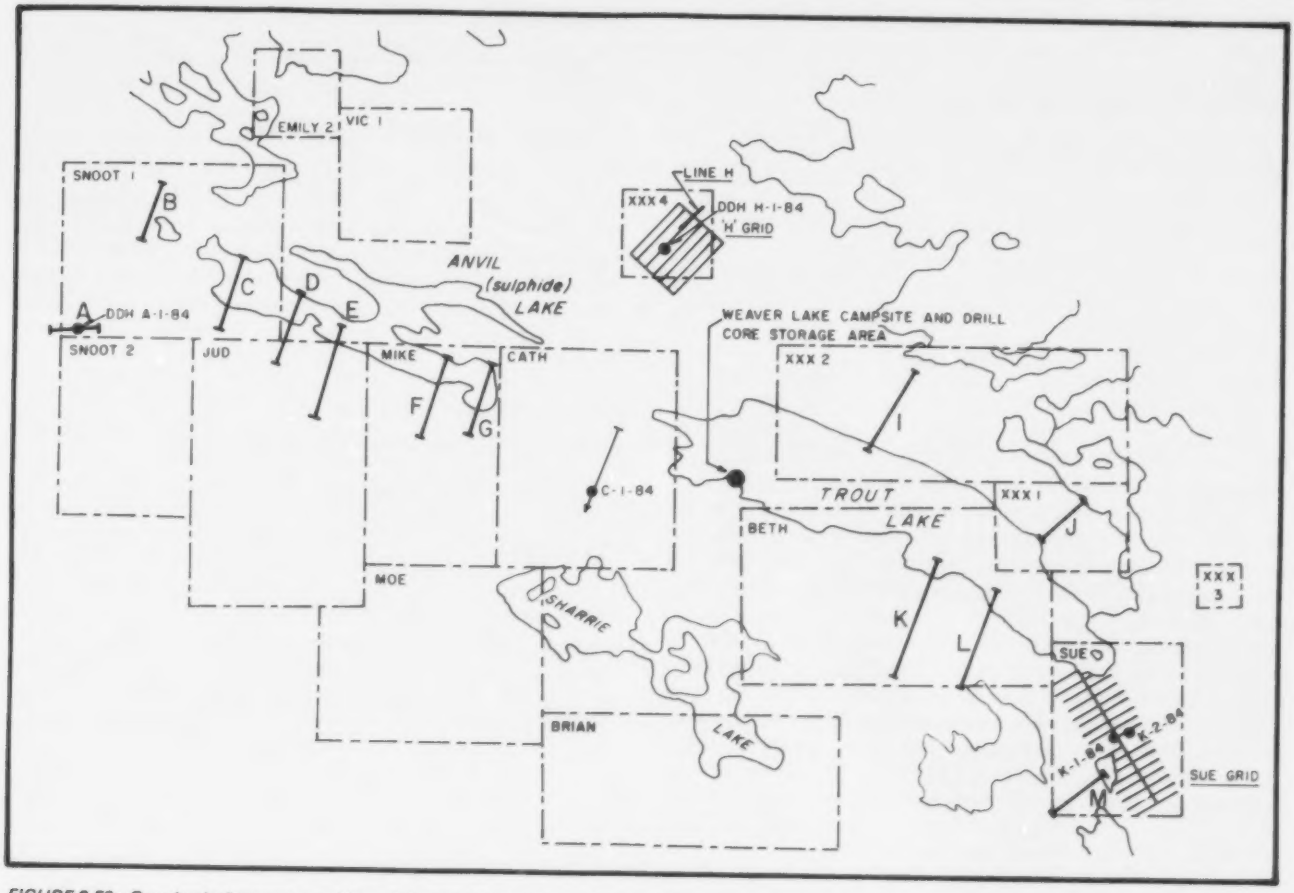



*FIGURE 8-52: Geophysical traverses, grids and diamond drill hole locations on Noranda claims in the Anvil Lake area. See Figure 8-48 for location.*

and dip west. The auriferous veins are narrow and contain minor tourmaline, galena, sphalerite, pyrrhotite, arsenopyrite, pyrite and chalcopyrite.

### CURRENT WORK AND RESULTS

In 1984 the MIK claim was prospected, sampled and mapped during a 44-day program conducted by H.E. Neal and Associates Ltd. of Toronto. Forty-six chip samples of quartz vein assayed from trace (38 samples) to 2.2 ppm Au.

## COVE 1, TCS 2 CLAIMS

Tantalum Mining Corp.
of Can. Ltd.
P.O. Box 28,
Toronto-Dominion Centre
Toronto, Ont., M5K 1B8

Tantalum, Tin
85 I/11,12
62°38'N, 112°30'W

### REFERENCES

Henderson (1985); Lord (1951); Seaton and Crux (1985).
DIAND assessment reports; 081683, 081885.

### PROPERTY

COVE 1 (495 ha) and TCS 2 (514 ha).

### LOCATION

The claims are 50 km east-northeast of Yellowknife

### HISTORY

The claims were staked in 1981-1982 to cover ground favourable for tantalum- tin-bearing pegmatites. The properties are centered on the Freda Pegmatite dyke, which was mined for tantalite in 1946 (Lord, 1951) and is now held by Cominco (TABE claim). In 1982, a number of pegmatite dykes on COVE and TCS were sampled and analyzed for tantalum and tin but results indicated sub-economic concentrations (maximum 0.028% $Ta_2O_5$, 0.47% SnO). A lithium lithogeochemical survey was also done in 1982 (Seaton and Crux, 1985).

### DESCRIPTION

The claims are underlain mainly by metaturbidites of the Archean Yellowknife Supergroup, but mafic to intermediate volcanics are also present (Henderson, 1985). Pegmatites

cutting the sediments trend northwesterly and dip 50° to 80° west.

### CURRENT WORK AND RESULTS

In 1983, a lithogeochemical survey was completed to delineate blind tantalum-tin-bearing pegmatites. The premise for this survey is that the emplacement of tantalum-tin-bearing pegmatites is accompanied by extensive metasomatism of the country rocks by the elements lithium, cesium and rubidium. Of these, lithium is the most mobile and can be expected to migrate the farthest, forming aureoles around the pegmatites. Rubidium is the least mobile and forms much thinner and less intense aureoles. Commonly, a rubidium anomaly forms a relatively narrow zone around an individual pegmatite, resulting in a rubidium low or depression immediately over top of the pegmatite. The lack of mobility of rubidium relative to cesium is offset by higher crustal abundance of rubidium.

The bedrock was sampled at 75 m intervals along chained compass lines 300 m apart. At each station approximately 0.5 kg of fresh chip sample was taken. The samples were analyzed for $Rb_2O$; the results were plotted on a base map and contoured.

In general, the contoured results reveal a very noisy rubidium signature; the anomalies have tight, northerly trending, composite features. The anomalies defined by the previous lithia survey are not as well defined by the rubidium survey and direct correlation with the lithia anomalies is fair. The rubidium anomalies (maximum 200 ppm) are not intense and contrast poorly with the general background levels (about 60 ppm).

The claims were allowed to lapse in 1985.

## RUSH CLAIM

John U. Bayly
Box 2882, Ste. 305
Laurentian Bldg.
Yellowknife, NWT

Gold
85 I/14
62°46.5'N, 113°20'W

### REFERENCES

Henderson, J.B. (1985).
DIAND assessment report: 081779.

### PROPERTY

RUSH claim (41.8 ha).

### LOCATION

The claim is south of Gordon Lake, 65 km northeast of Yellowknife.

### HISTORY

The claim was recorded by C. Donaldson in 1979 and transferred to Archie Mandeville in 1981 and to John V. Bayly in 1984.

### DESCRIPTION

The claims are underlain by highly folded greenschist-grade turbidites of the Burwash Formation (Henderson, 1985).

### CURRENT WORK AND RESULTS

Four holes totalling 61 m were drilled in 1985 to evaluate auriferous quartz veins. The best assay obtained was 17.6 ppm Au across 0.43 m in a massive white quartz vein carrying sericite inclusions and 2% pyrite. The adjacent wall rocks are graphitic argillites containing relatively barren quartz veins and stringers. The second best assay was 2.8 ppm Au across 1.28 m.

## GBI CLAIMS

Great Bear Explorations Inc
c/o John Foster
Monte Lake, B.C., VOE 2N0

Gold
85 I/14
62°47'N, 113°15'W

### REFERENCES

Henderson, J.B. (1985); Henderson, J.F. (1941); Lord (1951); Riddle (1939).

DIAND assessment reports: 017323, 017372, 081471, 081802.

### PROPERTY

GBI 1,2 (479 ha).

### LOCATION

The claims are 69 km northeast of Yellowknife.

### HISTORY

Prospectors working for Dome Mines Ltd. found a number of gold showings south of Gordon Lake during the summer of 1938. A group of 43 claims, known as the SDC group, was staked in July 1938 and some trenching and diamond drilling was carried out.

In 1939, a detailed program of mapping, trenching and bulk sampling was conducted, and Dome concluded that further work would have been warranted had the property been in a less remote district. They estimated that grades averaging 17 ppm Au would be needed to make the property economic. Dome did no further work and allowed the claims to lapse in the late forties. Because of the low price of gold, which prevailed throughout the fifties and sixties, little work was done on the property.

In 1967-68, the property was acquired by Chemalloy Minerals and limited trenching and sampling were done. The claims were allowed to lapse because of low gold prices.

In 1973-74, Precambrian Shield Resources Ltd. acquired part of the old Dome holdings and carried out extensive exploration work around the main showing (shaft location on Fig. 8-53). This work included driving a decline and about 300 m of drifting and crosscutting, as well as considerable underground drilling. The company stated that the program had developed an indicated grade of 5.14 ppm Au over an average width of 13 m with a potential of about 1800 t per vertical metre.

The western third of the original Dome property was acquired by Great Bear Explorations Inc. in 1974. The subsequent fall in the gold price resulted in the claims being dropped after some very preliminary evaluation.

Great Bear Explorations restaked this ground as GBI 1 and GBI 2 in 1980 and 1981.

## DESCRIPTION

The area was mapped by J.F. Henderson (1941) at 1:63,360 and by J.B. Henderson (1985) at 1:250,000. The claims are underlain by tightly folded greenschist-grade turbidites (greywacke and argillite) of the Archean Burwash Formation. Riddle (1939) reported a number of banded iron formation units in the area comprising metre-thick continuous beds of dark, graphitic schist containing numerous seams of disseminated pyrite along cleavage planes. The metasediments are intruded by Proterozoic diabase dykes.

At least five gold showings, discovered in earlier years, are on the GBI claims (Fig. 8-53). Showings 5 and 6 comprise lenses and stringers of white and grey quartz intruded into beds of contorted and sheared argillites and argillaceous greywackes. These form irregular zones up to 30 m wide and 100 m long containing from 10% to 15% quartz.

Visible gold associated with fractured quartz and massive arsenopyrite has been reported in trench samples. The best assay from Zone 6 was 72 ppm Au from a 0.9 m channel sample in a trench.

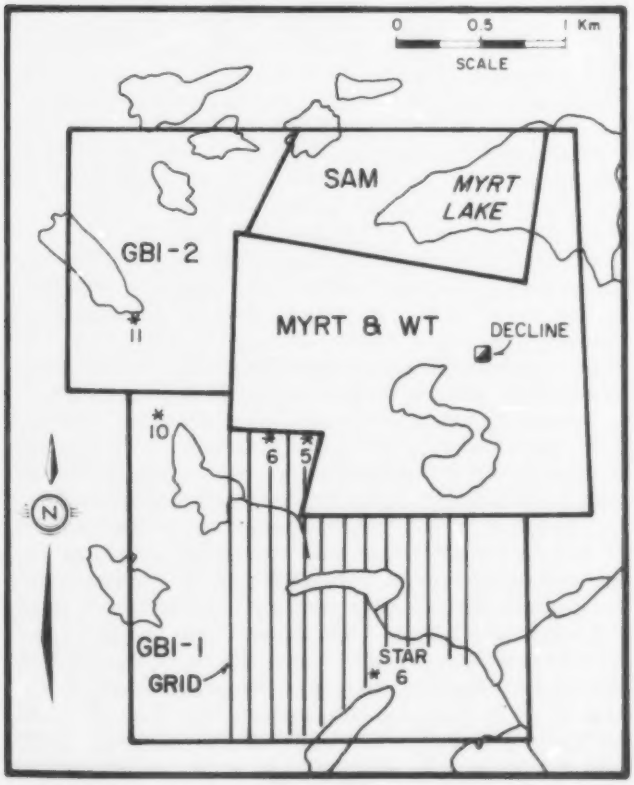



*FIGURE 8-53: Showings and grid on the GBI claims. The property is underlain by turbidites.*

Showing 11 comprises stringers and veins of white and grey quartz in an argillaceous greywacke bed. The veined zone is about 275 m long and up to 24 m thick. The best assay obtained from this zone was 6.2 ppm Au from a 0.61 m channel sample in a trench.

No description is available for the Star 6 showing, but seven samples were assayed, yielding from trace to 67 ppm Au.

Showing 10 is a large pod of grey quartz intruded along the contact of sheared graphitic schist and massive greywacke. Visible gold was observed in a 6 by 0.6 m section of the quartz pod. Accessory minerals include arsenopyrite, pyrite, pyrrhotite, galena, chalcopyrite and feldspar. A chip sample collected in 1974 assayed 28.5 ppm Au across 2.1 m. Assay results from samples collected outside of the zone of visible gold were not encouraging.

## CURRENT WORK AND RESULTS

A rock geochemical survey was conducted in 1984 to test the gold content of host rocks and previously unsampled quartz stringer zones on the property. A grid (Fig. 8-53) was established on GBI 1 and samples consisting of 10 small rock chips from a 1 $m^2$ zone were collected at 50 m intervals where possible along lines. A total of 228 samples (of ten chips each) were sampled and analyzed for gold and silver. Most of the samples (76%) contained less than 5 ppb Au. The best anomaly was 215 ppb Au. No clusters of gold anomalies were detected. Most of the samples contained less than 0.1 ppm Ag. The best anomaly, 2.9 ppb Ag, did not correspond with a gold anomaly. No clusters of silver anomalies were detected. Eighteen quartz-vein zones on the grid were sampled and assayed. The best assay was 0.6 ppm Au.

# CLAM CLAIM

Canadian-United Minerals Inc.
#215, 543 Granville St.
Vancouver, B.C., V6C 1X8

Gold
85 I/14
62°55'N, 113°19'W

## REFERENCES

Henderson, J.B. (1985); Henderson, J.F. (1941).
DIAND assessment report: 082048.

## PROPERTY

CLAM 1 (105 ha).

## LOCATION

The claim is 70 km northeast of Yellowknife.

## HISTORY

According to a local prospector, Charles Vaydik, trenches near the southeast corner of the claim were excavated in 1946, but there is no record of this work in DIAND assessment files. A grab sample collected from one of these trenches in 1980 by Giant Yellowknife Mines Ltd. assayed 190.6 ppm Au. CLAM 1 was recorded in 1984 and partly envelopes a smaller claim (CINDY 1) recently staked by Mr. Charles Vaydik.

## DESCRIPTION

The claim is underlain mainly by greenschist-facies metasediments of the Burwash Formation (Henderson, 1985; Henderson, 1941). These comprise a northwesterly striking, sub-vertically dipping succession of interbedded greywacke and argillite that have been intruded by quartz veins and diabase dykes.

## CURRENT WORK AND RESULTS

A one-day evaluation of the claim was carried out by Mr. Lou Covello in May, 1984. An area of quartz stockwork comprising 20% quartz veins across 150 by 40 m was identified north of the trenches. The veins are north-trending, up to 10 cm thick, and contain sparse pyrite, galena and sphalerite at one locale. No assays were reported, but channel sampling of the stockwork zone was recommended.

# MQ GROUP

Black Ridge Gold Ltd.
520 Lincoln Bldg.,
W. 818 Riverside Ave.
Spokane, Wa., 99201

Gold
85 I/14
62°56'N, 113°12'W

## REFERENCES

Henderson, J.B. (1985); Henderson, J.F. (1941); Lord (1951).

DIAND assessment reports: 080981, 080892, 081574, 081762, 081939.

## PROPERTY

AUR 1-3 (627 ha), JAL (105 ha), MCC (146 ha), and MQ 1 (21 ha).

## LOCATION

The claims are on the east shore of southern Gordon Lake, 80 km north-northeast of Yellowknife.

## HISTORY

The area was staked as the DAF claims in 1946 by J.R. Woolgar and G. Wonnacott. In 1947 the owners erected a mill and recovered 1.55 kg of gold from about 16 t of ore. The property was acquired by West-Bay Yellowknife Mines Ltd. in 1948, a new mill was erected, and 6.89 kg of gold were recovered from 262 t of ore.

In 1977, the ground formerly covered by DAF 4 was restaked as MQ 1 by Mr. John Doucette and acquired by Black Ridge Gold in 1981. The other claims were added in 1983 and 1984.

During 1982-83, Black Ridge drilled 426.7 m in 20 holes. The best intersection assayed 686 g/t Au across 0.46 m. In 1984, Cruiser Minerals Ltd. signed an agreement with Black Ridge to explore the property, and 24 holes totalling 1209 m were drilled. This work established reserves of 5 kt grading 30.4 g/t Au in an ore shoot 18 m long by 91 m down dip by 1.37 m wide.

## DESCRIPTION

The MQ group area was mapped by J.F. Henderson (1941) at 1:63,360 and by J.B. Henderson (1985) at 1:250,000. The claims are underlain by greenschist-grade turbidites (greywacke and argillite) of the Archean Burwash Formation. The sediments have been isoclinally folded into a series of overturned anticlines and synclines, and cut by several Proterozoic diabase dykes. Bedding tops generally face north, fold axes trend northeast, and beds dip 75°-85° easterly. A gold-bearing quartz vein (Main Vein), mined in the forties, occupies the nose of a syncline that opens and youngs to the northeast. A pit measuring about 30 m long, up to 7.6 m wide and 9 m deep marks the site of the former mining operations. The Main Vein varies from thin stringers to a solid mass up to 6.1 m thick, and can be traced in outcrop and old trenches for about 43 m. Only a third of that strike length is ore bearing, but, the ore shoot has been traced down plunge (about 52°) to the northeast for at least 100 m. The Main Vein consists of dark grey and white quartz containing minor pyrite, galena and chalcopyrite. A more detailed description is given by Lord (1951).

## CURRENT WORK AND RESULTS

### Detailed Grid

A detailed grid, 150 m by 150 m, consisting of 21 east-trending crosslines and 3 north-trending baselines (3.7 line km of cut line), was established on the Main Vein. This grid provided survey control for the detailed geological, geophysical and geochemical surveys that were done in 1985.

The grid area was geologically mapped at 1:240. Only two rock types were observed, greywacke and argillite, with the former predominating as thick, monotonous beds. Mapping confirmed that the Main Vein occupies the nose of an overturned syncline whose axis trends about 040°.

Geophysical surveys included magnetometer and VLF-EM. Magnetometer readings were taken at 3.8 m intervals on all cut lines. There is a weak magnetic low over the Main Vein. Several strong near-surface anomalies may be due to concentrations of pyrrhotite and magnetite, which are common accessories in the greywackes and argillites. Magnetic anomalies were also obtained over some sheared slate beds containing quartz veins. VLF-EM readings were taken at 3.8 m intervals along all cut lines using the Seattle, Washington transmitter. No conductors were detected.

The geochemical survey consisted of sampling immature B-horizon soils every 3.8 m along cut lines. A total of 322 samples, 37.4% of the possible maximum (many samples stations were underlain by outcrop or muskeg) were collected and analyzed for gold, silver, arsenic, copper and lead. A 40 ppb Au contour effectively outlines zones of interest, although results were as high as 4000 ppb Au. An anomalous zone (greater than 40 ppb Au) around the Main Vein is about twice as large (73 by 30 m) as the vein itself. No significant silver anomalies were found. Arsenic anomalies (greater than 15 ppm As) generally mimic gold anomalies. Some copper (greater than 40 ppm) and lead (greater than 20 ppm) anomalies were outlined and although they generally mimic gold anomalies, their distribution is erratic and appears to preclude their use as pathfinder elements.

Ten channel samples, each almost 1 m long, were collected

from various veins within the detailed grid area and assayed for gold. Most assays were less than 0.03 g/t Au, the best assay was 2.27 g/t Au.

**Main Grid**

The main grid consists of a 1.8 km picketed baseline (Fig. 8-54) with 31 blazed and flagged winglines at 60 m intervals and 11 fill-in lines. This grid, which covers 1.8 by 1.1 km, provided survey control for the geological, geophysical and geochemical surveys.

The main grid was mapped at 1:1200. With the exception of a 7.6 m wide diabase dyke striking about 320° across the northern portion of the grid, only greywacke and slate were observed. The beds generally strike northeasterly and face northerly. Quartz veins several centimetres wide are common along the margins of argillite beds. They are probably the result of remobilization of silica from greywacke during metamorphism and precipitation along the more impermeable argillite units. Several larger quartz veins were found, but no significant gold assays were obtained despite repeated trenching and sampling.

Geophysical surveys on the main grid consisted of magnetometer and VLF-EM. Magnetometer readings were taken at 7.6 m intervals along all lines. Numerous small anomalies were obtained, but no specific causes could be found despite detailed prospecting. Quartz veins usually appear to occupy narrow (15 to 30 m) magnetic lows flanked by zones of somewhat higher magnetic response. The VLF-EM survey outlined several strong conductors. One anomaly occupies a gully and is suspected to be caused by a bedding plane fault. A soil sample from the gully yielded 30 ppb Au, the best anomaly obtained from the main grid. Another anomaly concides with a quartz-vein swarm that was trenched in earlier years, but which failed to yield significant gold assays. A long, linear anomaly corresponds to a mapped anticlinal axis.

A total of 330 B-horizon soil samples were collected, mainly from the central part of the main grid, and analyzed for gold and arsenic. All samples returned less than 5 ppb Au except for the 30 ppb anomaly discussed previously. Some As anomalies (greater than 30 ppm) were found, but did not correlate with geological or geophysical targets.

**Peninsula Grid**

Work done on the grid consisted of soil sampling and geophysical surveys to evaluate quartz-veined zones from which assays of as much as 3.4 g/t Au across 4.6 m were obtained. Twenty-three soil samples were analyzed, yielding three gold anomalies (15 to 60 ppb) and four arsenic anomalies (110 to 210 ppm). The area of widest quartz veining is a moderate magnetic high flanked by magnetic lows. No VLF-EM conductors were identified.

**Prospecting Program**

That part of the property not covered by grids was prospected by traversing at intervals of about 350 m. A total of 29 soil samples was collected in the vicinity of a prominent fault extending across the central part of the claim group, but no gold anomalies and only one weak arsenic anomaly were obtained. Quartz veins were sampled, but only two yielded significant gold anomalies. A flagged, 120 by 120 m grid (Peninsula Grid of Fig. 8-54) was established to cover these showings.

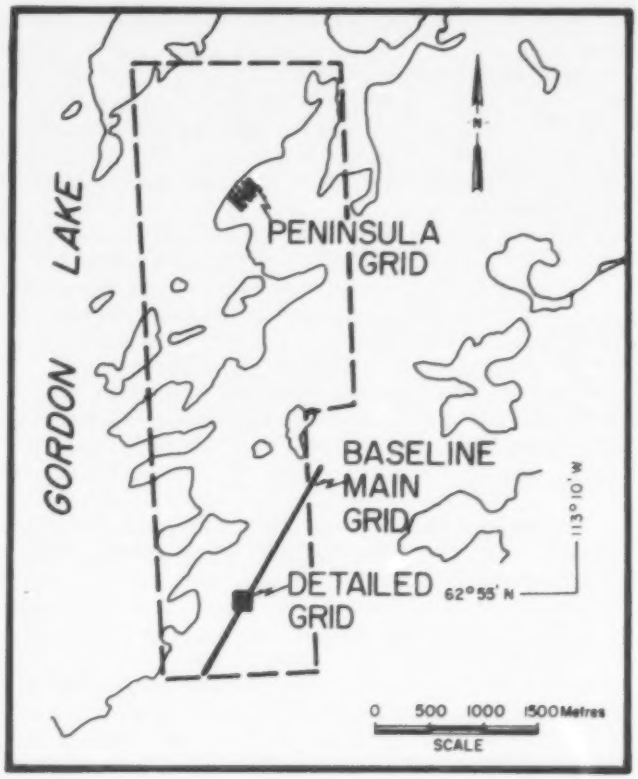



*FIGURE 8-54: Outline of the MQ group showing the positions of the detailed grid, the Peninsula grid, and the baseline of the Main grid. The claims are underlain by turbidites.*

## AM AND GB CLAIMS

Salish Resources Ltd.
Suite 715,
675 W. Hastings St.
Vancouver, B.C., V6B 1N2

Gold
85 I/14
62°56'N, 113°20'W

**REFERENCES**

Henderson (1985); Henderson (1941).
DIAND assessment report: 081927.

**PROPERTY**

AM (42 ha) and GB 1-2 (836 ha) claims.

**LOCATION**

The claims are southwest of Gordon Lake on the south side of Knight Bay, about 85 km north-northeast of Yellowknife.

**HISTORY**

The property was staked as the TREACY group in September, 1946. Four gold-bearing quartz zones on the claims received varying amounts of surface exploration consisting of trenching, sampling and mapping. A limited amount of diamond drilling was carried out on the showings during early exploration. In 1951, a crude 3 tpd rocker-bed mill was installed on the property at the site of the No. 1 and 2 Zones

by Boreas Yellowknife Gold Mines Ltd. The feed for this mill came from a 5 by 1.2 m zone in the No. 1 Trench. Five channel samples taken across this mineralized pod ranged from 4 ppm Au across 90 cm to 196 ppm Au across 90 cm. About 5 t of tailings in one of the trenches and about 30 t of broken ore, some of which has been crushed, are still at the site. The mill was very inefficient and only a small amount of gold was recovered.

The No. 1, 2 and 3 Zones were geologically mapped and resampled by Consolidated Northland Mines Limited in 1958. In 1963, the entire property was geologically mapped and the No. 1 and 2 Zones again sampled by Expander Mines and Petroleums Ltd. The TREACY claims were taken to lease for 21 years in May, 1959 and then allowed to lapse in 1980. In 1982, AM was staked by Dave Nickerson of Yellowkife, NWT. GB 1 and GB 2 were added to the group in late 1983 and the entire group has been purchased by Salish Resources Ltd.

### DESCRIPTION

The property is underlain by greenschist-grade metaturbidites of the Archean Burwash Formation (Henderson, 1985; Henderson, 1941). Irregularly shaped quartz veins are very common on the property. Two types of quartz are recognized macroscopically: grey and white. Grey quartz varies in colour from light grey to bluish grey and is, at least locally, cut and injected by white quartz veins. There appears to be no distinction between the white and grey quartz with respect to gold mineralization. Both types form pods or nests, are always related to folding, and form along the axis or on the saddles of folds. Secondary quartz veins crosscutting all structures are always white.

Three isoclinal fold axes have been mapped on the property. These appear to have been subsequently re-folded by younger deformation forming gentle open warps. The quartz veins are localized along the limbs of the isoclinal folds.

Sulphides in quartz veins and adjacent country rocks are predominantly pyrite, pyrrhotite and arsenopyrite. Trace amounts of chalcopyrite, galena and sphalerite may be present. Gold is incorporated in the arsenopyrite crystal structure but visible free gold is also present. Arsenopyrite is generally restricted to the sediments adjacent to quartz vein or stringers, while the free gold is usually in or directly adjacent to the quartz. Vein quartz constitutes less than 10% of the rock in the area.

### CURRENT WORK AND RESULTS

A 7.6 line km grid was established over the central part of the property. North-trending winglines were cut at 60 m intervals and chained at 30 m intervals. A VLF-EM survey on the grid did not reveal any anomalies. Mapping (1:1200) and prospecting on the grid delineated four gold showings (Zones 1-4) on the flanks of isoclinal folds. Two NQ holes totalling 103.6 m were drilled to test two showings. Hole 85S-01, drilled southeast of the exposed end of Zone 3, did not intersect significant gold. Hole 85S-02, collared on the west side of Zone 1, intersected two weakly mineralized zones (1.95 ppm Au across 2.2 m and 1.81 ppm Au across 2.0 m). Geochemical analyses of 29 grab samples ranged from less than 5 ppb Au to 1850 ppb Au, with one sample greater than 10,000 ppb Au. A one-day reconnaissance prospecting program on the property did not find other showings.

## BEAR CLAIMS

Silver Hart Mines Ltd.
209, 320 Sioux Road
Sherwood Park, Alta., T8A 3X6

Gold
85 I/16
62°53'N, 112°26'W

### REFERENCES

Henderson (1976).
DIAND assessment report: 081902.

### PROPERTY

BEAR and BEAR 1, 2.

### LOCATION

The claims are at and directly east of Amacher Lake, 110 km northeasterly from Yellowknife.

### HISTORY

The BEAR claims were recorded in February 1983.

### DESCRIPTION

The claims are underlain by mafic volcanics, granodiorite and minor amphibolite.

### CURRENT WORK AND RESULTS

In 1984, ten diamond drill holes totalling 819 m, tested a silicified, carbonatized and arsenopyrite-bearing zone in metavolcanics (chlorite and chlorite biotite schists). A number of narrow, weakly auriferous zones were intersected. The best assay was roughly 8 g/t Au across 1 m.

## MARLIN CLAIMS

Golden Marlin Mines Ltd.
Box 54
Langham, Sask., S0K 2L0

Gold
85 J/1,7,8
62°18'N, 114°28'W

### REFERENCES

Baragar (1966); Boyle (1961); Helmstaedt and others (1979); Helmstaedt and Padgham (1985); Henderson (1970, 1975, 1976, 1978); Henderson and Brown (1966); Jolliffe (1942, 1946); Seaton (1978, 1983a); Seaton and Hurdle (1978).
DIAND assessment reports: 081871, 081872, 081873.

### PROPERTY

MARLIN 1-31.

### LOCATION

The claims are 10 to 25 km southerly from Yellowknife and cover much of the outer part of Yellowknife Bay, including the West Mirage and many of the East Mirage Islands (Fig. 8-55).

### HISTORY

The northern part of the MARLIN claim block was, in part, previously covered by the YT group, the history of which is

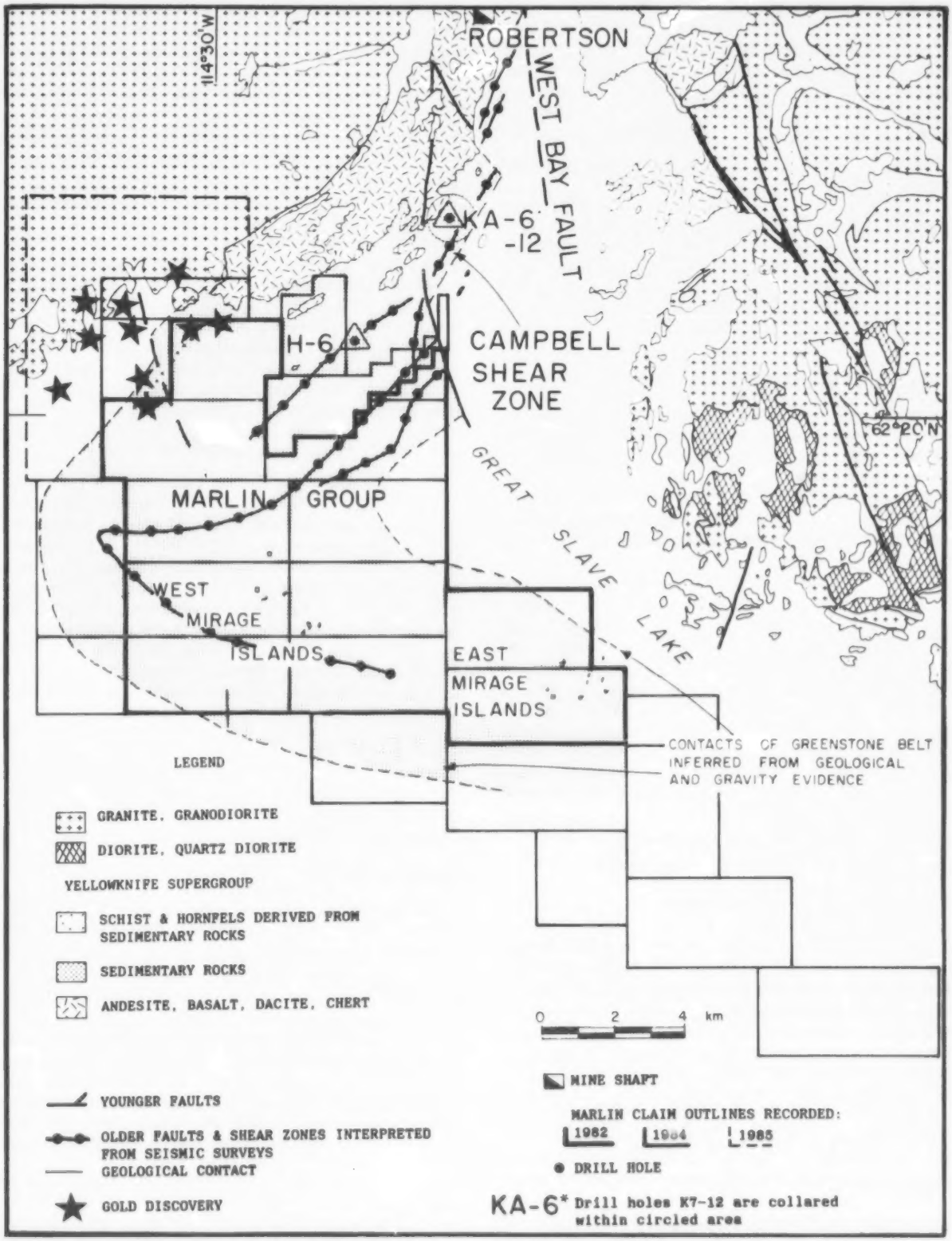



*FIGURE 8-55: MARLIN claims, Yellowknife Bay. Compilation of claim data and geology from DIAND assessment report 081873.*

summarized in Seaton (1978, 1983a) and Seaton and Hurdle (1978).

MARLIN 1-10, 4A and 5A were recorded in February 1982. MARLIN 14-28 were recorded in July and October 1984 and MARLIN 29-31 in September 1985.

### DESCRIPTION

The claims cover an area at the mouth of Yellowknife Bay where islands of Archean volcanics and gabbroic sills, locally cut by Proterozoic diabase dykes, outcrop at or near the southernmost end of the Yellowknife Volcanic Belt. The northern part of this area has been mapped by Helmstaedt and others (1979). Other references cited cover the geology of the Yellowknife Volcanic Belt as a whole, the geochemistry and genesis of its gold deposits (Boyle, 1961) and its geochemistry (Baragar, 1966).

### CURRENT WORK AND RESULTS

During 1984, work included geological mapping, prospecting, sampling (including underwater sampling using scuba - equipment), and marine seismic surveying. Four gold showings were discovered.

In 1985, work consisted of an IP survey over lake ice, overburden drilling, additional water-borne seismic surveying, aerial photography and a helicopter-borne magnetic and EM survey.

## TREM CLAIMS

Treminco Resources Ltd.
1110-625 Howe St.
Vancouver, B.C.

Gold
85 J/8,9
62°32'N, 114°12'W

### REFERENCES

Henderson (1985); Jolliffe (1946).
DIAND assessment report: 082052.

### PROPERTY

TREM 1-5.

### LOCATION

The claims are south of Prosperous Lake, about 8 km northeast of Yellowknife. They are accessible by road from Yellowknife via the Ingraham Trail.

### HISTORY

The Yellowknife area has been intensively prospected for gold since the thirties. The TREM claims cover ground previously staked as the AVI and RANEL groups, but there is no record of work done on these claims in DIAND assessment files. The TREM group was recorded in 1984.

### DESCRIPTION

According to 1:63,360 scale mapping by Jolliffe (1946), the property is entirely underlain by metasediments of the Burwash Formation (Henderson, 1985). Rocks in the west half of the claim group have been metamorphosed to greenschist facies and consist mainly of greywacke and argillite. Rocks to the east have been metamorphosed to amphibolite facies and comprise cordierite-rich metasediments derived from greywacke and argillite. The cordierite isograd wanders northerly through the center of the claims. Beds generally strike north-northwesterly and are overturned to the east throughout the western two-thirds of the property. Dips vary from 45° to vertical, but are on average about 65°. The eastern third of the property is transected by the northerly trending Ptarmigan Fault. Dips to the east of the fault are generally moderate (25°-40°) to the west, and the beds are not overturned. Immediately north of the property, on either side of the Ptarmigan Fault, a number of major west-northwesterly trending auriferous quartz veins cut the metasediments. Ptarmigan Mine, now controlled by Cominco, exploited these quartz veins in 1941-42, producing about 360 kg of gold. Further to the north, again adjacent to the Ptarmigan Fault, development work is currently in progress on a number of auriferous crosscutting quartz veins lying on Treminco Resources Limited's TOM claims.

### CURRENT WORK AND RESULTS

One geologist spent 27 days evaluating the gold potential of the TREM group by prospecting, mapping and sampling. Geological data were recorded on 1:4800 scale topographic base maps prepared by the McElhanney Group Ltd. of Vancouver. Fifty-nine rock-chip samples collected from areas of interest were analyzed for 30 elements and assayed for gold. Only two of the rock-chip samples returned significant gold assays (22.9 ppm and 12.48 ppm Au), but both of these were from the Ptarmigan property. The multi-element analyses did not yield reliable geochemical suites that might be indicative of gold-bearing formations or structures.

## PRO CLAIMS

Laurence B. Halferdahl, for
Prosperous Syndicate
18, 10509-81 Ave.
Edmonton, Alta., T6E 1X7

Gold
85 J/9
62°34'N, 114°15'W

### REFERENCES

Baragar (1961); Helmstaedt and others (1980); Henderson (1985); Jolliffe (1938); Lord (1941, 1951); McGlynn (1971).
DIAND assessment reports: 081835, 082040.

### PROPERTY

PRO 3-8 (2864 ha).

### LOCATION

The claims are between Walsh Lake and Prosperous Lake within 20 km of Yellowknife. Access is by boat from Yellowknife to Prosperous Lake via the Yellowknife River, or by road to Vee Lake and boat to Walsh Lake.

### HISTORY

The claims are in the Yellowknife area, which has been extensively explored, mainly for gold, since the early thirties when ore deposits were found at Yellowknife. The history

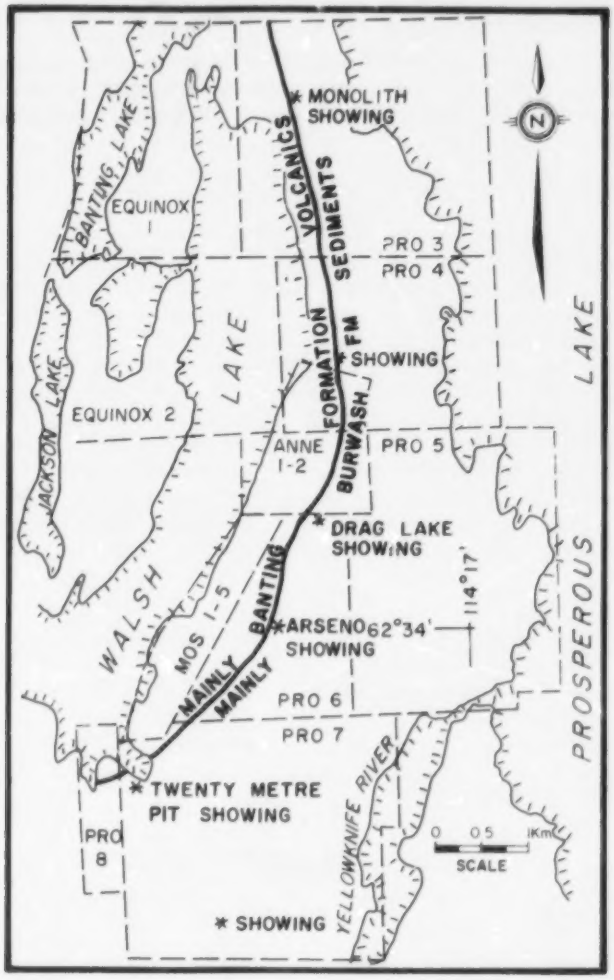



*FIGURE 8-56: Gold showings on the PRO claims (geological contact taken from Helmstaedt and others, 1980).*

of exploration in the claims area is too complex to summarize completely in this forum. Past exploration is more fully described by Baragar (1961), Jolliffe (1938), Lord (1941, 1951), and McGlynn (1971).

The most extensive gossan on the property, situated in the northwest corner of PRO 7 (Fig. 8-56), was initially staked as the BELL-MURPHY group in 1928. It was restaked as the LEN group in 1957 and a shallow trench excavated by the previous owners, now known as the Twenty Metre Pit, was deepened to 2.4 m. Four samples collected by Baragar (1961) yielded assays of trace to 0.17 ppm Au. Noranda restaked the gossan in 1977 as the LAW claims. These later lapsed. PRO 3-7 were recorded in May of 1983 and PRO 8 was added in August, 1984.

## DESCRIPTION

The claims are underlain by an arcuate but northerly trending, east-facing, steeply dipping succession of metavolcanics and metasediments of the Archean Yellowknife Supergroup. They cover (Fig. 8-56) felsic to intermediate volcanic rocks of the Upper Banting Formation and extend easterly into the metaturbidites of the overlying Burwash Formation (Henderson, 1985). Considerable amounts of sulphides were noted by Helmstaedt and others (1980) along the volcanic-sedimentary contact, which is marked by interbedded volcanics and argillite. The volcanics contain some fine-grained iron sulphides.

## CURRENT WORK AND RESULTS

### 1984 Work

In 1984, parts of the property were mapped at approximately 1:9000. In general, the map is in agreement with that of Helmstaedt and others (1980). Three showings, the Twenty Metre Pit, Arseno and Monolith showings (Fig. 8-56), were mapped in detail and sampled. Samples were also collected from the Drag Lake showing and two other unnamed showings on the property (Fig. 8-56). A total of 96 rock samples from sulphide-rich zones were analyzed for gold, copper, lead, zinc, molybdenum, arsenic and tin. Twenty-five samples of various lithologies were petrographically described. The main conclusions stemming from this work are:

1) Gold concentrations significantly above the crustal abundance of 4 ppb are present at several places within the property.

2) The highest gold concentration, 5.6 g/t across 5 m, is from the Arseno showing on PRO 6 about 1 km east of Walsh Lake. This interval includes a quartz vein carrying large amounts of arsenopyrite with 3.7 g/t gold.

3) The largest concentration of sulphides encountered in 1984 is at the Twenty Metre Pit showing on claim PRO 7 at the southeast end of Walsh Lake, where several metres of almost massive pyrrhotite and minor associated chalcopyrite are present just above the contact of the Upper Banting Formation with the overlying Burwash Formation. The structure consists of steeply plunging folds with the showing at the northern end of a linear drift-covered depression, which marks a fault. The highest gold concentration is 73 ppb, much below an economic grade.

### 1985 Work

In 1985, part of PRO 7, including the Twenty Metre Pit showing, was mapped at 1:2000. Parts of PRO 4, 5, 6 ,7 and 8 were mapped at 1:4000. The Drag Lake Showing was mapped at 1:1000. Additional work included lake sediment sampling, biogeochemical sampling, chip sampling, overburden drilling and the drilling of one Winkie hole.

The geological investigations confirmed that the contact between the Upper Banting Formation and the Burwash Formation, which varies from abrupt to gradational, is characterized by the presence of massive to bedded or vuggy pyrite-pyrrhotite in a zone up to 15 m thick. Disseminated pyrite-pyrrhotite extends further down into the Upper Banting Formation and for 5 to 20 m up into the Burwash Formation metasediments.

The Burwash Formation metasediments are disharmonically folded over the more competent metavolcanics of the Upper Banting Formation. Structures in the metasediments are complex and difficult to resolve because of the absence of marker beds. However, the metasediments generally face east between Prosperous and Walsh lakes, and there is no evidence of the existence of the Yellowknife Syncline postulated by Henderson (1985) in this area.

A total of 31 rock-chip samples were collected from areas of interest and analyzed for gold, copper, lead, zinc and arsenic.

In a biogeochemical survey, thirty-six samples of Labrador Tea were collected at 10-m intervals along six lines ranging in length between 32 m and 90 m. Samples were analyzed for copper, lead, zinc, arsenic and gold.

Sixty sediment samples were collected, mainly from small lakes, and analyzed for gold, copper, lead, iron and manganese. An attempt was made to sample basal overburden using a Stihl 4308 powerhead and JKS augers. However, progress through permafrost was too slow and only one sample was retrieved.

One 8 m long Winkie hole was drilled in a covered area immediately east of the Twenty Metre Pit Showing. Only sparse sulphides were encountered.

## EQUINOX, TING, WAL CLAIMS

Walter J. Humphries
P.O. Box 1856
Yellowknife, NWT, X1A 2P4

Gold
85 J/9
62°37'N, 114°17'W

### REFERENCES

Baragar (1961); Helmstaedt and others (1980); Henderson (1985); Jolliffe (1938); Lord (1941, 1951); McGlynn (1971).

DIAND assessment reports: 017330, 017373, 017422, 061422, 080251, 080741, 081393, 081897.

### PROPERTY

EQUINOX 1-2 (962 ha)
TING 1-2 (544 ha)
4 WAL claims ( 66 ha)

### LOCATION

The claims are 16 to 24 km north of Yellowknife and cover Banting Lake as well as the northern half of Jackson Lake and Walsh Lake. Access is by float plane to any of these lakes, or by road to Vee Lake and thence by boat to the property.

### HISTORY

The claims are in the Yellowknife area, which has been extensively explored, mainly for gold, since the early thirties when ore deposits were found at Yellowknife. Banting Lake is named after Dr. Banting (co-discoverer of insulin) and Jackson Lake after Group-of-Seven artist, A.Y. Jackson. Banting and Jackson were members of a field party that participated in this early exploration. The history of exploration in the claims area is too complex to summarize completely in this forum. Past exploration is more fully described by Baragar (1961), Jolliffe (1938), Lord (1941, 1951), McGlynn (1971), and in the various DIAND assessment reports listed above under REFERENCES. Parts of the present claims were previously held as the NIB, DOT, LEE, SAMEX and JW groups.

The WAL 1-15 claims were recorded by W.J. Humphries in 1974. Most of these lapsed, but four were taken to lease in 1984. The TING and EQUINOX claims were recorded in 1983.

### DESCRIPTION

The claims are underlain by a northerly trending, steeply dipping succession of Archean Yellowknife Supergroup metavolcanics and metasediments (Fig. 8-57), (after Helmstaedt and others, 1980).

### CURRENT WORK AND RESULTS

Work done in 1985 included reconnaissance prospecting and detailed mapping and sampling of the various showings (Fig. 8-57) previously discovered on the claims. Most of the showings consist of sulphide- and/or quartz-bearing auriferous shears. Pop-hole trenching (10 pops) was done on the Sam Otto, Samex and Mispickle showings. One hundred samples were collected and analyzed for gold. Soil samples collected along several topofil traverses were analyzed for gold. A trail was cut from a boat-landing site on Banting Lake to the Nib North showing. About 2200 m of line were cut on TING 1 parallel to the Nib North zone, and about 150 m on EQUINOX 1 to re-establish an old baseline. The resulting highlights of this work are summarized in Figure 8-57.

## VAD CLAIMS

Lawrence Mining Corporation
6508 East Blvd.
Vancouver, B.C., V6P 5P9

Gold
85 0/1
63°04'N, 114°13'W

### REFERENCES

Tremblay (1952).
DIAND assessment reports: 080256, 081976.

### PROPERTY

VAD claim (20.9 ha).

### LOCATION

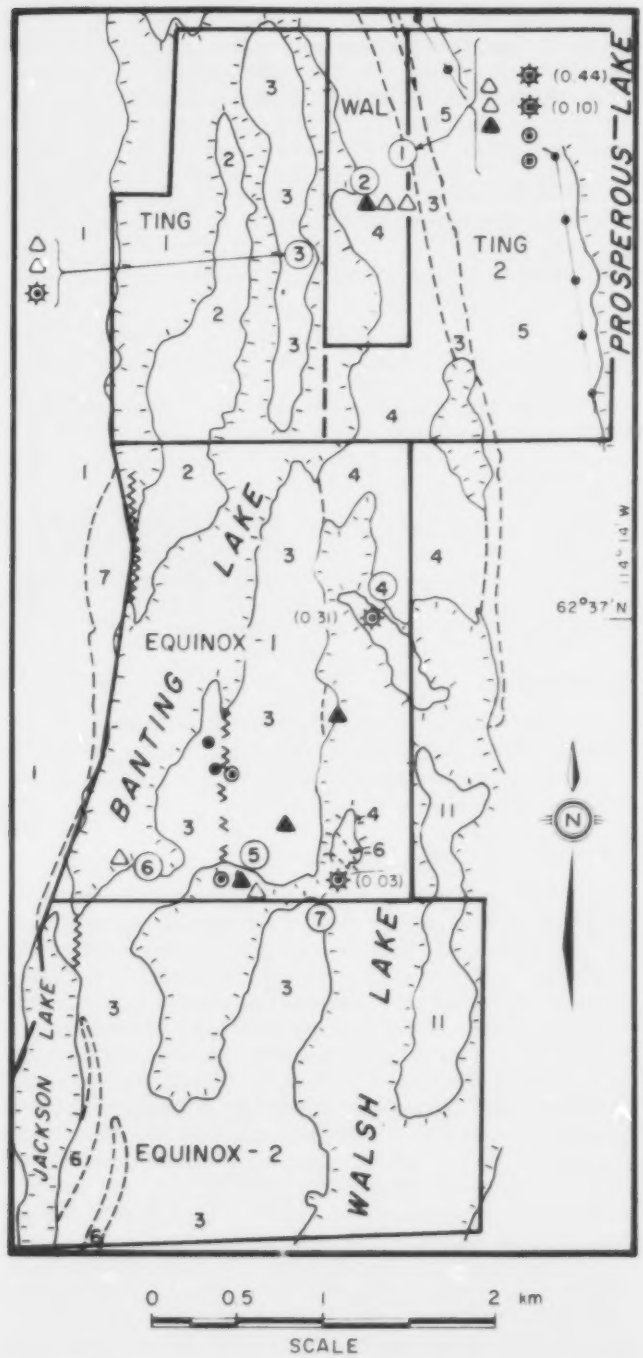
The claim is 65 km north-northeast of Yellowknife.

### HISTORY

It is reported (DIAND assessment report 081976) that 5 trenches were excavated on the property in 1965, and that assays ranging from 2.0 to 58.0 ppm Au were obtained from trench samples. The area was staked as GOD 1 and explored by Nemco Exploration Ltd. in 1974. Eighteen samples collected from quartz veins in diorite were assayed; the best result being 13.7 ppm Au across a 20 cm wide vein (DIAND assessment report 080256). VAD was recorded in 1980 and transferred to Lawrence Mining Corporation in 1982.

### DESCRIPTION

The claim is underlain by diorite flanked by Archean metasediments (greywacke, argillite) of the Yellowknife Supergroup (Tremblay, 1952). Mineralized quartz veins intrude the diorite in a restricted area north of Goodwin Lake. The veins form a stockwork comprising less than 5% of rock volume and exhibiting no preferred orientation. They are generally narrow, discontinuous and only sporadically mineralized with




LEGEND

7 granite, granodiorite

6 mafic dykes, sills

Yellowknife Supergroup

5 BURWASH FORMATION: greywacke, siltstone, slate

4 WALSH FORMATION: argillite, graphitic argillite (pyritic in part)

3 BANTING FORMATION: felsic-intermediate tuffs, breccia, cherty tuffs, silicified tuffs, ignimbrites, exhalitive carbonates, minor basic flows

2 JACKSON LAKE FORMATION: conglomerate, sandstone

1 KAM GROUP: basic, intermediate metavolcanics, minor felsic cherts

ROCK GEOCHEM SYMBOLS

| Sample Site | ppb Au range |
|---|---|
| ⊙ | >1000 |
| ◎ | 500 - 1000 |
| ▲ | 200 - 500 |
| △ | 100 - 200 |
| ● | 50 - 100 |
| ○ | <50 |

GOLD SHOWINGS

1. Nib North
2. Nib Central
3. Samex
4. Mispickel
5. Sam Otto
6. Equinox 1
7. Equinox 2
8. Anne

⊙ (C-2) assay in oz/T

*FIGURE 8-57: Geology of the TING, WAL and EQUINOX claims and prospecting highlights.*

pyrite, arsenopyrite, chalcopyrite, sphalerite and galena. Gold appears to be associated with sulphide-rich zones.

### CURRENT WORK AND RESULTS

In 1985, the quartz-veined zone was blasted and sampled to make a general assessment of the economic potential. No assays were reported. No further work was recommended in view of the small volume of quartz-vein material.

## JIM CLAIMS

Lawrence Mining Corp. Ltd.
6508 East Blvd.
Vancouver, B.C., V6P 5P9

Copper, Zinc
85 P/6,7
63°22.5'N, 113°W

### REFERENCES

Moore and others (1951).
DIAND assessment reports: 060048, 081940.

### PROPERTY

JIM 1-2 (209 ha).

### LOCATION

The claims are 120 km north-northwest of Yellowknife.

### HISTORY

The main showing on the claims, an exposure of massive sulphides comprising pyrrhotite, pyrite, chalcopyrite and sphalerite, was staked and trenched by Mr. G. McLeod in 1956. Various owners restaked the ground during the sixties and seventies, but no work was reported. A portion of a regional airborne input survey by Great Plains Petroleum covered the claims in the seventies (DIAND assessment report 060048). This survey outlined a strong north-northwesterly trending conductor coinciding with the main showing. The JIM claims, which cover this conductor, were recorded by Mr. J.W. Essery in 1981. The property was transferred to Lawrence Mining Corporation in March of 1982.

### DESCRIPTION

The claims are underlain by Yellowknife Supergroup mafic metavolcanics and a small granitic to granodioritic intrusion (Moore and others, 1951).

### CURRENT WORK AND RESULTS

Work in 1985 consisted of a one-day visit to the property by two geologists and a prospector to assess the main showing and to determine the nature of the conductor associated with it. The conductor corresponds to a zone of massive sulphides that was traced on the ground for about 1500 m. Five pits were excavated into the massive sulphides approximately 0.80 km north-northwest of the main showing. The pits expose a 9 m wide zone varying from massive sulphides to silicified metavolcanics carrying finely disemmiated sulphides. Country rocks are schistose andesites that are commonly silicified near the massive sulphides. The best assays from four grab samples were as follows: 0.08% Cu, 0.15% Zn, 0.17 ppm Au and 2.57 ppm Ag.

## KA CLAIMS

Giant Yellowknife Mines Ltd.
Box 2000
Yellowknife, NWT, X1A 2M2

Gold
85 P/8
63°17'N, 112°12'W

### REFERENCES

Moore and others (1951).
DIAND assessment report: 081888.

### PROPERTY

KA 1 (627 ha).

### LOCATION

The claim is south of Beniah Lake, about 140 km northeast of Yellowknife.

### HISTORY

There are trenches and pits on the property that date from the mid forties, but there are no signs of drilling and no record of geophysical surveys. The KA claim was recorded for Mr. William Kizan in August of 1983 and transferred to Giant Yellowknife Mines Ltd. in May, 1985.

### DESCRIPTION

The claim, which is included in 1:253,440 mapping by Moore and others (1951), is underlain mainly by mafic metavolcanics (Yellowknife Supergroup) forming part of the Beaulieu River Greenstone Belt.

### CURRENT WORK AND RESULTS

In 1985, the western portion of the claim near Bridge Lake (Fig. 8-58) was mapped at 1:10,000 and the remainder of the claim in less detail. Three northerly trending volcanic units were recognized: 1) massive mafic intrusions and flows; 2) pillowed flows; and 3) banded chloritic schists. The pillowed flows occasionally include pillow breccia, and tuffaceous units 1 to 3 m thick are occasionally found in the massive and pillowed flows.

A total of 100 samples were assayed to assess showings exposed in previously completed trenches and to test newly discovered zones. Three types of gold-bearing formations were encountered: 1) late-stage quartz veins, 2) sulphide-rich tuffs and concordant quartz veins and 3) narrow, finely banded arsenopyrite-rich bodies within mafic units.

Samples from late-stage quartz veins assayed less than 3.4 ppm Au. Sulphide-rich tuffs associated with quartz lenses and chert contained a maximum of 31.2 ppm Au, but this encouraging assay was from a thin (10 cm) tuff band that was found to be relatively unmineralized elsewhere (0.34 ppm Au in another sample collected 3 m along strike). Significant assays from other thin sulphide-rich tuff units include: 12.68 ppm Au in a chip sample across 30 cm; 5.5 ppm Au in a grab sample of pyritic quartz and siliceous country rock, and 16.8 ppm Au in a grab sample from a 2 to 3 cm wide band of grey siliceous tuff. All of these results were obtained from samples collected from trenches east of Bridge Lake. In the vicinity of Top Lake, an arsenopyrite-rich tuff unit was identified that assayed 17.83 ppm gold across 35 cm. Sul-

phides associated with the auriferous tuffs are pyrite and arsenopyrite. Encouraging results were also obtained from sampling of trenches in the northwest part of the property. The trenches expose a siliceous, arsenopyrite-bearing unit hosted in mafic volcanic rocks. It is first noted as thin (1 to 2 cm) veinlets of arsenopyrite, pyrite and quartz in mafic volcanics, but swells along strike (345°/58°E) to a maximum of 40 cm before dwindling into another series of thin veinlets. Significant assay results were obtained from this unit, including 39.77 ppm Au across 35 cm. The auriferous unit has been traced in trenches for a strike length of about 25 m.

## KAT CLAIMS

Giant Yellowknife Mines Ltd
Box 2000
Yellowknife, NWT, X1A 2M2

Gold
85 P/8
63°19'N, 112°20'W

### REFERENCES

Moore and others (1951).
DIAND assessment reports: 019652, 081888.

### PROPERTY

KAT 1-3, 5 (2509 ha).

### LOCATION

The claims are in three separate blocks (Fig. 8-58) and are east and west of the southeast arm of Beniah Lake, about 140 km northeast of Yellowknife.

### HISTORY

The area has been prospected since the mid forties, with work concentrated on rusty shear zones in volcanics and on gossans associated with sulphide-rich exhalites. In 1970-1971, Shield Resources conducted airborne EM and magnetometer surveys over the area and followed up on the resulting anomalies by staking, linecutting, geophysical surveying, mapping and drilling (DIAND assessment report 019652). Base- and precious-metal indications from the zones tested were not encouraging, and the various claim blocks were allowed to lapse. The KAT claims were recorded by L. Covello and M. Senkiw in May of 1984 and transferred to Giant Yellowknife Mines Ltd. in August, 1985.

### DESCRIPTION

The claims, which are included in 1:253,400 mapping by Moore and others (1951), are underlain mainly by mafic metavolcanics (Yellowknife Supergroup) forming part of the Beaulieu River Greenstone Belt.

### CURRENT WORK AND RESULTS

The claims were staked to cover EM anomalies and sulphide showings reported from previous work. Gold in the Courageous Lake - Mackay Lake greenstone belt to the east (see to Chapter 2, Salmita Mine) is associated with late-stage felsic volcanics at the top of a mafic volcanic sequence. The purpose of exploration in 1984 was to search for equivalent stratigraphy on the KAT claims and to sample carbonate alteration zones, disseminated and massive sulphides, and quartz veins within the volcanic pile. The claims were mapped at 1:10,000 and areas underlain by felsic volcanics and felsic sub-volcanic intrusions were identified. Siliceous exhalites (chert, flow-banded rhyolite and felsic tuff) were recognized at the top of a volcanic cycle in both the eastern and western claims. In the W-Zone, a zone of intense silification 1 km north of Rhyolite Lake (Fig. 8-58), greywacke and argillite deposited on bedded chert are overlain by a younger sequence of mafic flows. A total of 160 grab samples were collected from the claims for assay. Most of these were samples of carbonate alteration zones and felsic volcanic rocks. All assays were less than 1.0 ppm Au, and the majority of the samples contained only trace amounts of gold. Most silver assays were correspondingly low, although samples from the Rhyolite Lake area returned up to 63 ppm Ag.

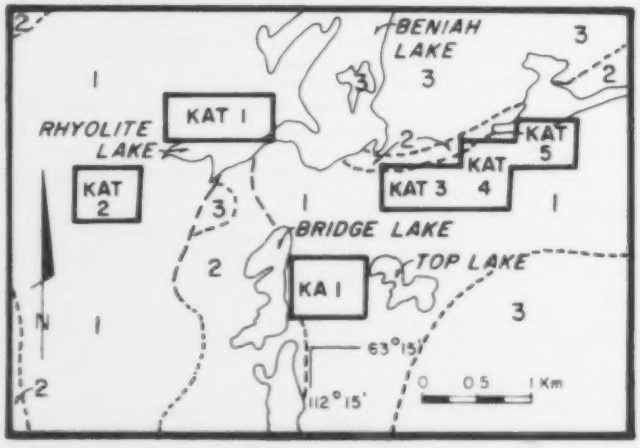



*FIGURE 8-58: Geology of the KAT and KA claims, Bridge Lake area (geology from Moore and others, 1951).*

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